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Dental Digest

JANUARY, 1948

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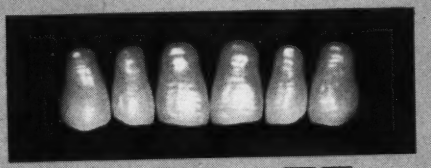

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About Our CONTRIBUTORS

JACOB SARNOFF, M.D. (New York University College of Medicine, 1908) and ARTHUR B. ADELMAN, D.D.S. (Columbia University School of Dental and Oral Surgery, 1929) have collaborated in reporting on a case of prognathism in which the mandible was surgically reduced by sectioning. Doctor Sarnoff practices general and plastic surgery and is a member of the International College of Surgeons. He taught in the Department of Anatomy at the Long Island College of Medicine for seven years. A number of his articles appear in the medical literature. Doctor Adelman emphasizes orthodontia and surgery in his general practice. He was formerly on the staffs of Mt. Sinai and Mid-town Hospitals and is now Associate Dental Surgeon at Coney Island Hospital with which he has been associated for seventeen years.

DOCTOR MEISTROFF concludes a series of three successive articles on exodontia by summarizing and demonstrating the functions and advantages of expansion and sectioning techniques. The previous discussions described the use of the Impactor.

C. A. STURDEVANT, D.D.S. (The Thomas W. Evans Dental Institute, University of Pennsylvania, 1928) is a general practitioner. The basic idea of his procedure for improving prosthetic occlusion originated in a method taught by Doctor O. C. Applegate in a postgraduate course in Partial Denture Prosthesis at the Kellogg Foundation, University of Michigan. Doctor Sturdevant's modified method obviates the carving of buccal and lingual surfaces while providing for carving the occlusal surfaces of posterior teeth. It also avoids certain difficulties in the packing of the case by the laboratory.

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PROGNATHISM:

Case Report of Surgical Reduction

JACOB SARNOFF, M.D., and ARTHUR B. ADELMAN, D.D.S., Brooklyn

DIGEST

To correct the protruding mandible in this case of prognathism, the elongated ascending rami were sectioned just above the angle of the jaw and the mandible was retracted 12 millimeters. This surgical approach, osteotomy, was chosen in preference to ostectomy, the removal of a portion of the mandible to shorten it.

Etiology, Types, Treatment

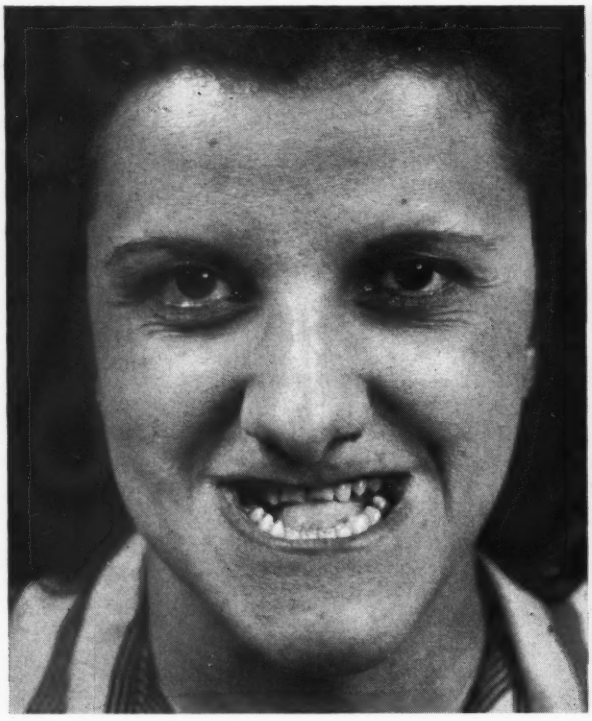
PROGNATHISM is a protrusion of the mandible beyond the maxilla in which the lower incisor teeth are anterior to the upper incisors and the chin is abnormally prominent.

The etiology of prognathism is obscure. Acromegaly is the only type for which the cause is known, and even here there is the question of what caused the dysfunction of the pituitary gland. Neither orthodontia nor surgery but corrective prosthesis is advisable in the true acromegalic condition.

Atavistic Origin — The cause of prognathism may lie, as Doctor Hooton[1] conjectures, in the evolutionary recession of the bony structures of the face. The stages of human evolution from fish through reptiles and our early ancestors is a record of continual recession of the facial bones from a protruded, snout-like formation to the shorter-faced and sometimes chinless specimen of today. It is within the realm of possibility that a latent hereditary factor, carried in the genes of the individual, manifests itself by a return to an earlier form and prognathism results.

[1]Hooton, E. A.: The Evolution and Devolution of the Human Face, Am. J. Orthodont. & Oral Surg. 32: 657-673 (December) 1946.

1. ***Prognathism. Anterior view showing extent of projection of lower teeth.***

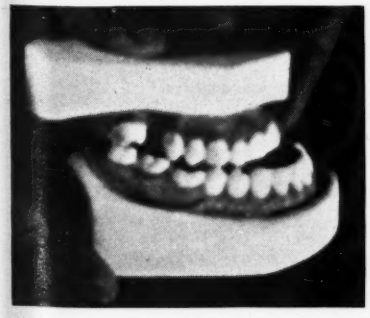


2. ***Lateral view indicates obtuse angle and elongation of mandible.***

3. ***Roentgenogram revealing malocclusion of the teeth and projection of the jaw.***

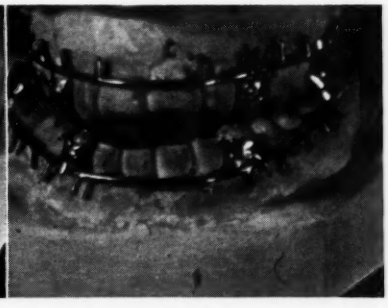
Degrees of Protrusion—The degree of protrusion varies in different types.

1. Mild protrusion, in which the lower incisors are just anterior to and in contact with the upper incisors, responds to orthodontic correction. Usually the problem here is one of underdevelopment of the maxilla and facial bones. Orthodontic management develops the upper arch and brings the occlusion and facial structures into a harmonious whole.



4. ***Study models show malocclusion of teeth.***

5. ***Working model of lower jaw. Labial arch with spurs in place in molar tubes and locked anteriorly by wire hooks on cuspid bands.***



6. ***Upper and lower working models with labial arch splints in place.***

2. Severe protrusion in which the mandible, either because of an enlarged mandibular body or elongated ascending rami, is completely out of relation to the rest of the skeletal structure of the face, can best be resolved by surgery. In this condition the masticating ability is poor. People with severe protrusion generally suffer from self-consciousness and personality defects. Kazanjian[2], Dingman[3], Thoma[4], and Lloyd[5] have all noted the psychic as well as the physical aspects of this deformity.

Surgical Correction — Fundamentally, two operations have been described in the literature by various authors: *Ostectomy* is the removal of a portion of the body of the mandible to shorten it; *osteotomy* is sectioning of the ascending rami of the mandible so that the whole mandible can be retracted to the desired position.

In the case under consideration, osteotomy was decided upon as the best course to follow. The reports on ostectomy are not favorable, from the viewpoint of external scarring, lengthy duration of fracture treatment, and the final result.

Case Report

The patient, a woman of 31, presented with a marked prognathism (Figs. 1 and 2) of the lower jaw. She complained of her appearance, the unhappiness it had caused her, and the inability to masticate her food. Hypoplasia of her anterior teeth and first molars gave evidence of early childhood illness. There was no other history of such malformation in her family.

Roentgenograms (Fig. 3) of her teeth and jaws were taken, photo-

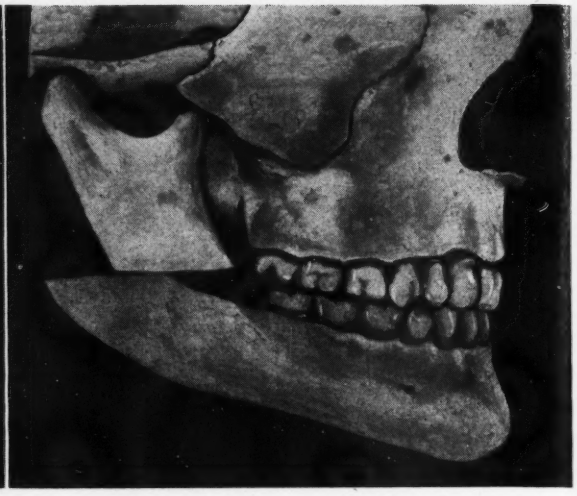
[2]Kazanjian, V. H.: The Interrelation of Dentistry and Surgery in the Treatment of Deformities of the Face and Jaws, Proc. D. Centenary, pages 489-506 (March) 1940.

[3]Dingman, R. O.: Osteotomy for the Correction of Mandibular Malrelation of Developmental Origin, J. Oral Surg. **2**:239-259 (July) 1944.

[4]Thoma, K. H.: Y-Shaped Osteotomy for Correction of Open Bite in Adults, Am. J. Orthodont. & Oral Surg. **29**:465-479 (September) 1943.

[5]Lloyd, R. S.: Osteotomy for Correction of Mandibular Protrusion, Am. J. Orthodont. & Oral Surg. **32**:445-455 (July) 1946.

7. ***Preoperative relation of teeth and mandible in this case of prognathism.***



8. ***Visualization of mandible after osteotomy demonstrating articulation of teeth and position of mandibular sections.***

graphs and study models were made, and a program of treatment decided upon.

Relations of Teeth and Jaws—The upper anterior teeth were in line with the mesial of the lower second bicuspids. Contact was present between the upper cuspids and the lower second bicuspids. Occlusal and cuspal relations were poor through lack of function. The arch forms of the upper and lower jaws, however, were similar, so that a satisfactory esthetic result could be obtained by surgery. This case was one of simple elongation of the ascending rami as outlined by Lloyd.[5]

The lower incisors projected 10 millimeters beyond the upper incisors. The width of the ramus was 24 millimeters. By doing an osteotomy of the ramus, as described by Dingman and Kazanjian, the mandible could be moved back 12 millimeters and sufficient contact of the fractured parts maintained for sound healing.

Preoperative Fixation — Fixation appliances (Figs. 5 and 6) were made and placed in the mouth the day before the operation by one of us (A.B.A.):

(1) Molar bands with round buccal tubes were cemented on the second molars; (2) bands with .024 lock wires were cemented on the cuspids; (3) arch wires of .040 were contoured to the shape of the jaws; (4) ten spurs of .040 wire were soldered to each arch wire, corresponding to the position of the interproximal spaces; (5) the upper and lower arches were inserted in the molar tubes, locked in place by the wires on the cuspid bands; (6) the rest of the teeth were ligated to the arch with .010 stainless steel ligature.

The advantages of this type of appliance were:

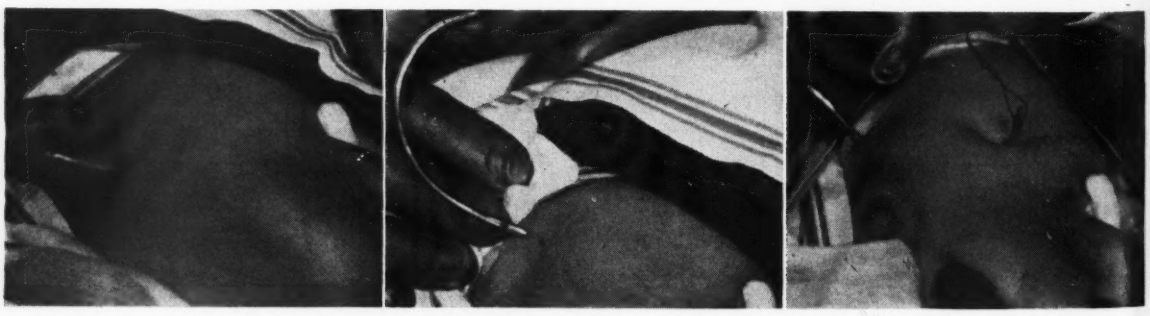
1. Firmness of fixation.
2. Adaptability. (Either elastics or wire ligature could be used and direction of force varied at will.)
3. Cleanliness. (Intermaxillary fixation could be removed at each visit for cleaning.)

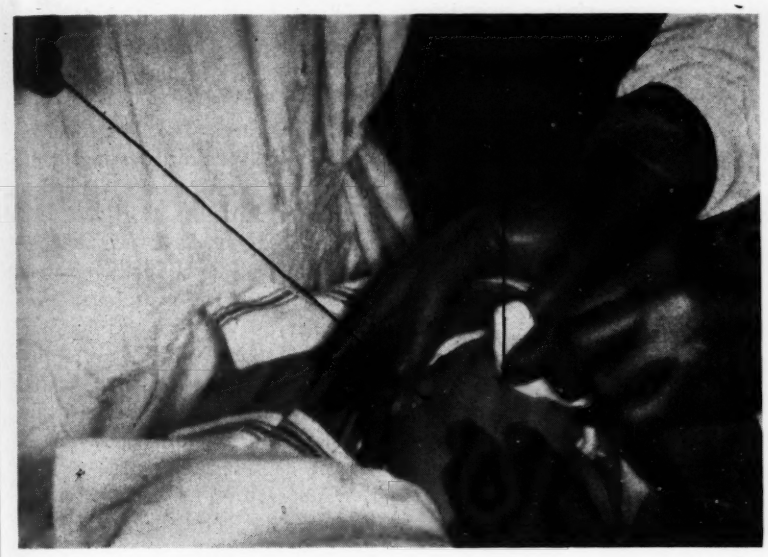
Surgical Procedure—Preoperatively, Demerol hydrchloride was administered. Anesthesia was induced with

9. ***Ascertaining by digital pressure the right angle of jaw above which osteotomy is to be performed. Protruding gauze at angle of mouth is end of gauze strip packed into pharynx in conjunction with endotracheal anesthesia.***

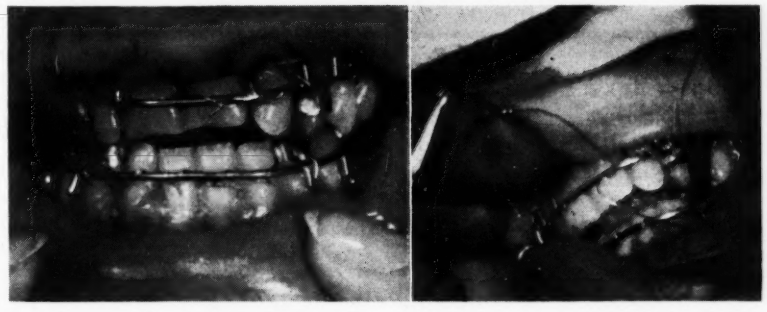
10. ***Blair needle is about to be introduced through skin puncture above angle of jaw.***

11. ***Blair needle in position behind mandible with Gigli saw wired to needle and ready to be pulled through.***





12. *Gigli saw in action.*



13. *Jaws and teeth in corrected position immediately following osteotomy.*

15. *Appearance of patient a few days following operation.*

14. *Rubber ligatures in place and stainless steel wire being applied around upper and lower arch wires for fixation of the mandible.*

intravenous pentothal sodium and supplemented by nitrous oxide-oxygen through an endotrachael tube. The pharynx was packed with a long strip of gauze to prevent any mucus or blood from entering the trachea and lungs. The field of operation was prepared by the surgeon (J.S.), the exposed portion of the face and neck being sterilized with alcohol, ether, and iodine.

1. Locating Plane of Fracture. The line of fracture to be established was a projection of the occlusal plane of the teeth through the ascending rami. This plane would give maximum contact of the fractured parts upon retrusion of the mandible (Figs. 7 and 8). It was visualized on the cheek, and proper points for insertion and exit of the Blair needle were located (Figs. 9, 10, and 11). The left mandible was severed first.

2. Passage of Blair Needle. The Blair needle was inserted below the ear lobe at the posterior border of the mandible. The needle was driven forward, hugging the inner surface of the ascending ramus toward the predetermined point of exit on the anterior aspect of the ramus. As the point of the needle raised the tissue of the cheek, an incision was made over it, so that an even-edged wound would result. The complete passage of the Blair needle left it curved around the inner aspect of the mandible with the point and eyehole exposed on the cheek.

3. Severing Mandible. One end of

Figures 9 through 14 are taken from the moving picture of the actual operation.

16. *Anterior view twelve weeks after operation.*

the Gigli saw was then securely wired to the eyehole of the Blair needle (Fig. 11). Withdrawal of the needle pulled the Gigli saw into the desired position (Fig. 12). With the mandible held firmly, a dozen strokes of the saw were sufficient to sever the mandible. (It was important during the sawing of the bone to stop at the moment of fracture so that as little damage as possible would be done to the periosteum and the overlying soft tissue.)

4. Retracting and Fixating Mandible. The same procedure on the right side produced a freely movable mandible which was then set in the desired position (by A.B.A.) (Fig. 13). Number 2 rubber elastics were set intermaxillary and two number 4 elastics placed from the upper second molars to the lower cuspid spurs on each side for distal traction. Two wire ligatures placed anteriorly limited any movement with the elastics (Fig. 14).

5. Final Steps. The four small incisions were sutured; dressings and a supporting bandage were applied to head and mandible (Fig. 15). The endotracheal tube was left in place until the patient had fully regained consciousness. The gauze strip from the pharynx was removed. (It was not blood-stained which showed that there was no damage done to the oral mucous membrane either by the needle, saw or fractured ends.) There was no nausea; little pain.

Postoperative Treatment—The case now was one of treatment of a bilateral simple fracture.

1. The patient was discharged from the hospital after four days.

2. Fixation was maintained for eight weeks, at which time it was determined that the bony union was sufficient to allow for limited movement of the mandible and exercise against the elastics.

3. After twelve weeks the appliances were removed and the patient resumed normal eating habits (Figs. 16, 17, and 18).

1406 *Albemarle Road.*
1201 *Cortelyou Road.*

17. *Roentgenogram. Lateral view showing degree of correction.*

18. *Lateral view of patient showing final result of osteotomy.*

Socket Expansion and Sectioning Techniques in EXODONTIA

C. L. MEISTROFF, D.D.S., Richmond, Virginia

DIGEST

This concluding article in a series of three on exodontia enumerates the specific points which establish socket expansion and sectioning as beneficial and advantageous techniques. The values of excellent roentgenograms in planning extraction procedures, utilizing these techniques, are listed.

In a series of roentgenograms the phases of crown sectioning and socket expansion are illustrated.

Functions

THESE basic techniques are responsible for:

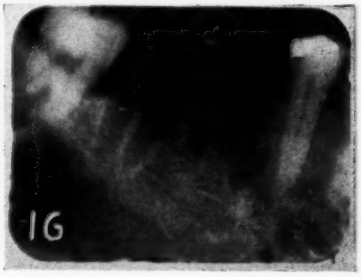
1. Eliminating trauma to neighboring teeth, to the ridge, alveolus, and adjacent soft tissues.
2. Preventing bone compression as in the indiscriminate use of elevators.
3. Providing an easy method of splitting and sectioning crowns.
4. Facilitating removal of root segments after sectioning.

Socket Expansion—This technique benefits the operator in these ways.

1. It provides an unquestionable method of severing the gingival periodontal ligament.
2. It causes minimal trauma to the alveolar-radicular area and accomplishes maximum loosening.
3. Directs full pre-extraction force against the individual tooth instead of an area or site.

Crown Sectioning—This technique facilitates extraction because it:

1. Reduces anatomic bulk of the



1. *Carious crowns in which sectioning technique was used.* ***A*** *Two proximating lower molars to be removed.* ***B*** *Natural lines of cleavage have been destroyed by caries. Crane pick point is therefore directed down and in towards bifurcation, the crowns being split from the lower part up.* ***C*** *First molar has been sectioned.* ***D*** *and* ***E*** *Parts are removed.* ***F*** *Distal coronal section is removed first because crown forms a grasping area.* ***G*** *Removal of remaining root and intact alveolus.*

2. ***Erroneous procedure in what appears to be a simple case, one of many in which the operator, without roentgenographs, simply grasps the tooth with a large beaked or cowhorn forceps and fractures the crown, leaving an alveolus full of root fragments and crown chips and probably damaging the buccal and lingual walls of the alveolus.***

A ***Case as it presented.*** ***B*** ***After a cowhorn forceps was applied, the film was taken. Usual procedure was followed with the forceps, and the crown completely cracked off.*** ***C*** ***What remained. Considerable effort was necessary to remove the root fragments and part of the buccal plate came out in the process.*** ***D*** ***Removal of this root fragment was a tedious process. Had the crown been sectioned, the natural lines of cleavage would have been followed to the bifurcation and the crown not shattered as in*** ***B.*** ***E*** ***Clean alveolus.***

crown. The coronal isthmus making up the bifurcation thus becomes more approachable.

2. Exposes the coronal portion of the root canal. Space is provided for elevator insertion so that lifting out of the alveolus or rotation is facilitated.

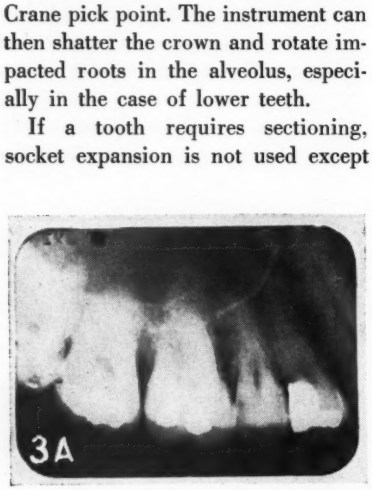
3. Provides an entrance for the Crane pick point. The instrument can then shatter the crown and rotate impacted roots in the alveolus, especially in the case of lower teeth.

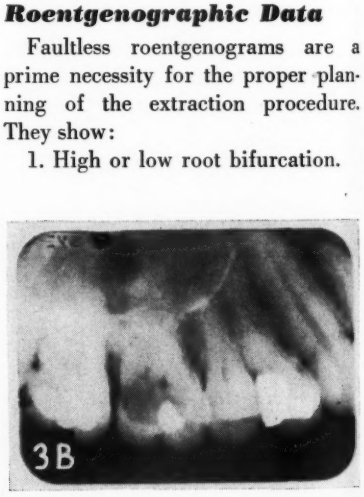
If a tooth requires sectioning, socket expansion is not used except for loosening the remaining root segments in the alveolus. A tooth still firmly resident in its alveolus allows entry of the bibevel chisel into the natural lines of cleavage without such damaging incidents as chipping of the crown or slipping off of the chisel.

Roentgenographic Data

Faultless roentgenograms are a prime necessity for the proper planning of the extraction procedure. They show:

1. High or low root bifurcation.





3. ***Removal of a crown, intact except for two small occlusal amalgam restorations.***

A ***Case as it presented for extraction.*** ***B*** ***With a bibevel chisel, crown was split in a mesiodistal plane in an effort to expose coronal portion of canal. Canal was exposed but not enough to benefit technique.*** ***C*** ***Chisel was laid again on the occlusal between buccal cusps; mesial section split off.*** ***D*** ***Remaining segment was sheared off with Crane pick point and remaining roots removed. A small gouge-shaped point was used to loosen the root remnants, and a hand elevator of same type, with a narrow straight blade, was used to pry them out and remove them.*** ***E*** ***Intact alveolus.***

4. ***Moderately difficult lower left third molar impaction. Here sectioning technique and socket expansion (for loosening and rotating tooth segments in alveolus) were employed.***

A ***Case as first viewed. Incision was made from distal crown to distal of second molar following the ridge. With crown exposed, bibevel chisel was placed on the occlusal and directed downward into the socket.*** ***B*** ***Split in crown.*** ***C*** ***Crane pick point was next forced into opening and distal segment sheared off. A small gouge point was forced into crown remnant in alveolus and loosened.*** ***D*** ***A Potts type elevator was inserted into exposed canal and the whole section lifted out. Distal root section was removed by placing small gouge point behind root at distal and driving down. This forced the root into the alveolus from where a Miller type elevator lifted it out.*** ***E*** ***Clean alveolus.***

2. Depth of cuspal grooves and their relation to the natural lines of cleavage.

3. Root aberration. (Knowledge of this condition makes proper approach, in the presence of caries or deep-seated restorations, possible.)

4. Amount of enamel still present.

5. Density of root structure.

6. Alveolar-root relation.

7. Relation of tooth to other anatomic structures such as canals, foramina, antra, nutrient canals.

8. Section of the crown to retain as a possible "handle" for easier removal of the root attached to it.

9. Indications for socket expansion, sectioning, or both.

Sectioning of the crown is influenced by (1) caries, (2) intactness, and (3) type and size of restoration. Each type of crown is distinctly different and requires a specific procedure.

Conclusions

1. Socket expansion used, if indicated, in conjunction with the sectioning technique, eliminates unnecessary osseous trauma.

2. Coronal sectioning, if necessary, prior to forceps application produces cleaner extractions, whether the tooth is carious or not.

3. Forceps and hand elevators are reduced to the role of accessory instruments, instead of being the mainstay of exodontia.

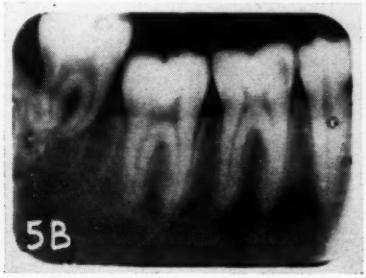
4. Careful observation of the condition of the crown and of root-relation, whereby the right instruments can be selected and the proper procedure chosen, will result in better exodontia.

5. It is best to shear off an intact crown, if necessary, so that interdental pressure will not be thrown against proximating teeth. Unnecessary alveolar shock and trauma can thus be avoided.

6. Sectioning towards the open side of a carious crown will reduce interdental shock or pressure.

7. No depressing psychologic effects on patients follow the application of these techniques.

113 *East Grace Street.*



5. ***Result of using socket expansion in removing simple impactions.***

A ***Case at first examination.*** ***B*** ***A small gouge-shaped elevator was worked into the buccal aspect of third molar from mesial to distal, the tooth loosened and worked out of alveolus. Neither incision nor elevator levering were required.*** ***C*** ***Empty and clean alveolus. Tooth was lifted out with a forceps—not extracted.***

Improved PROSTHETIC OCCLUSION

C. A. STURDEVANT, D.D.S., Meadville, Pennsylvania

DIGEST

After the requirements of esthetics and vertical dimension have been met and before a denture is processed, provision is made for assuring occlusion that will obviate post-construction adjustments.

Upper anatomic posterior teeth of acrylic are removed from the wax base, the occlusal surfaces are removed, and the teeth burred out to made tube-like forms. These are filled with melted wax after they have been luted to the wax base. The occlusal surface is then "milled in" by moving the lower posterior teeth against the uppers in the articulator and by placing the bases in the patient's mouth and having him move the mandible in lateral and protrusive directions.

Definite facets are thus formed in the blue inlay wax in the occlusal surface of the posterior teeth, which accurately reproduce the cuspal inclines of the lower posterior teeth. The inlay wax is then carved to complete the occlusal surface.

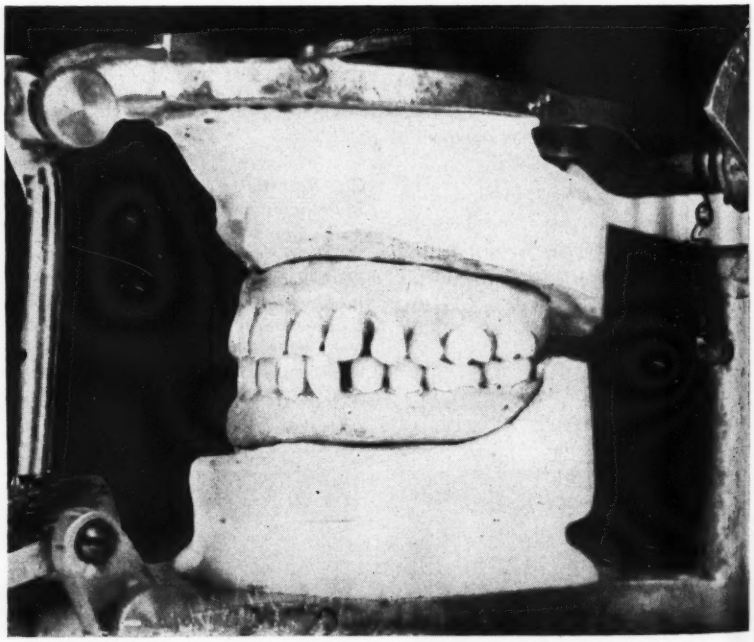
MOST DENTISTS realize the importance of balanced occlusion in prosthetic dentistry but have great difficulty in attaining that goal. The lack of proper occlusion has caused much peripheral soreness and necessitated time-consuming adjustments by the dentist. When the denture patient returns seeking relief from this annoying condition, the dentist frequently grinds the cusps out of occlusion and thereby often reduces the masticating efficiency of the appliance. The peripheral flanges of the denture are also often reduced needlessly and cause a loss of stability.

There are many methods of gaining proper occlusion in prosthetic cases. Following is one of them.

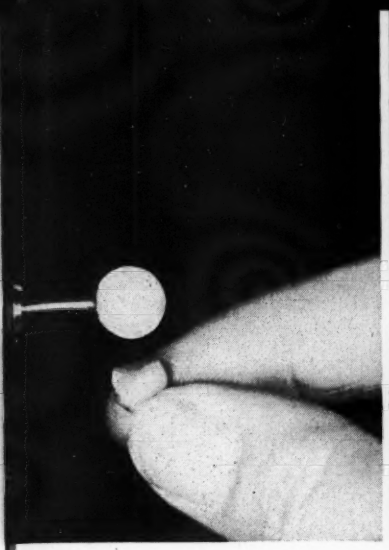
Procedure

Any anatomic articulator may be used with satisfactory results. It is advisable to use anatomic posterior teeth and necessary that the upper posterior teeth be acrylic. The lower posteriors may or may not be acrylic teeth, as the individual operator prefers.

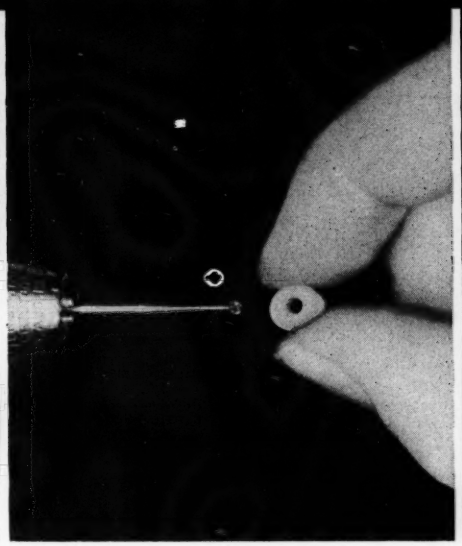
Figure 1 shows a case that has been set up in the customary manner.



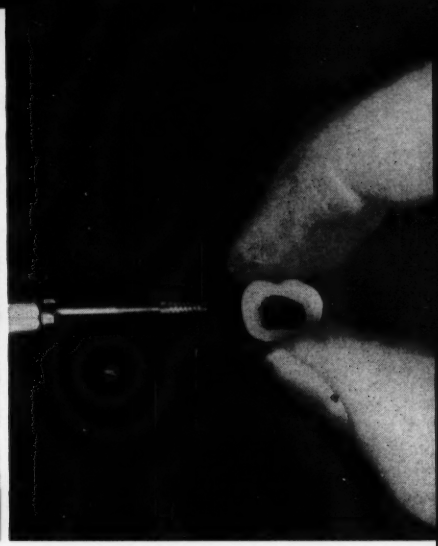
1. ***Full upper and lower case after try-in and results approved by patient and dentist.***



2. ***Upper bicuspid after removal of occlusal surface with "Faskut" stone.***



3. ***Upper bicuspid after drilling hole from occlusal to gingival.***



4. ***Upper molar after removal of acrylic from inside.***

It is assumed that the bases have been tried in the patient's mouth and meet the requirements of esthetics, vertical dimension, and other essentials. Ordinarily, at this point, the bases would be sent to the laboratory for processing. (It is important that the incisal guide pin of the articulator be tightly locked in the centric position.)

1. Remove the bicuspid and molar teeth of both the left and right sides from the upper wax base only. Take care to disturb the wax at the gingiva as little as possible. A plaster of paris mold or form can be made of the buccal alinement to ensure the replacement of bicuspids and molars in the original position. However, if care is taken in their removal, this is not necessary.

2. Using a round "Faskut" stone in a chuck, remove the entire occlusal surface from each of the upper posterior teeth (Fig. 2). Care should be taken to avoid reducing the height of the buccal cusps, for reasons that will be apparent later.

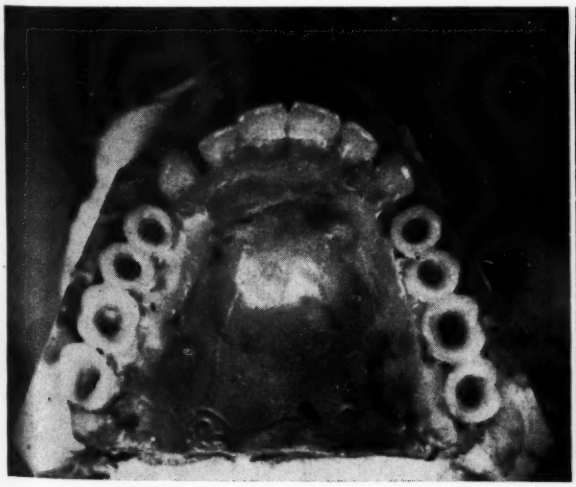
3. With a large round bur, drill a hole through each tooth from occlusal to gingiva (Fig. 3).

4. With a large fissure bur, remove nearly all of the acrylic material from the inside of the teeth so that they resemble tubes of acrylic material (Fig. 4). (A better result is obtained if the gingival and occlusal edges are tapered by using a flame-shaped "Faskut" stone.)

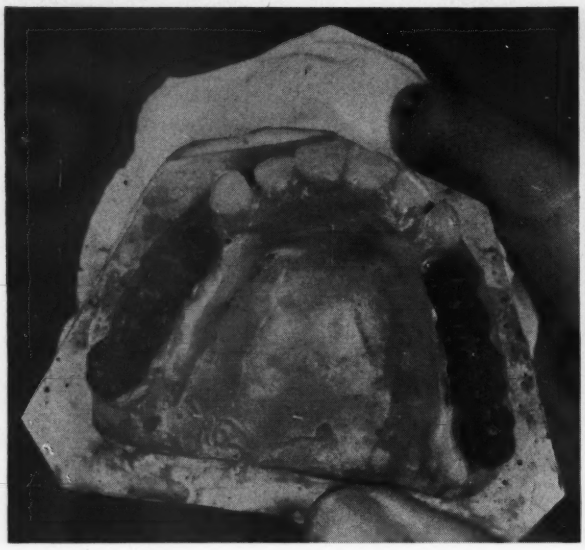
5. Return the prepared teeth to the wax base and lute securely in place with hard wax that will not soften at body temperature (Fig. 5). (I prefer Kerr's number 1 extra hard Korecta wax for this purpose.) Pour the melted wax down the holes in the teeth from the occlusal so that the teeth are approximately half full. Finish filling the holes and the entire occlusal surfaces with melted blue inlay wax. This should be done on both the left and right sides of the case.

6. *"Milling in" Occlusion* — By lengthening the incisal guide pin, the bite is opened approximately 3 millimeters. While the inlay wax on the occlusal surfaces of the upper posterior teeth is still soft, close the articulator. There should be a definite im-

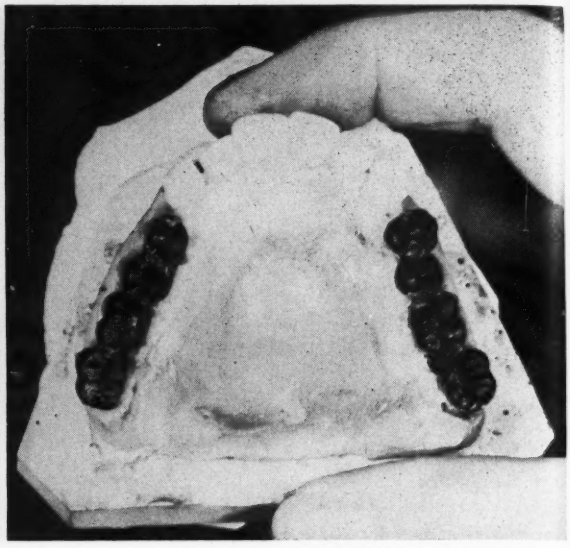
5. ***Prepared upper posteriors returned and luted in their original position.***



6. ***Upper posteriors with occlusals "over-filled" with blue inlay wax. Note that anteriors are out of occlusion.***



7. ***Upper posteriors after "chew in" by patient.***



8. ***Upper occlusal surfaces carved for escape of food during mastication.***

pression of the occlusal surfaces of the lower teeth in the blue wax of the uppers. If there is not, more inlay wax should be added until this is accomplished. With the incisal guide pin in contact with the incisal guide table, move the models through the various excursions of the mandible (Fig. 6).

7. Return the patterns to the mouth of the patient and instruct him to keep a firm biting pressure on them. Have him move the mandible in the various lateral and protrusive movements. As the inlay wax is worn down by the cusps of the lower posteriors, the occlusion of the anterior teeth can be checked. When the anterior teeth are in their original vertical position, the case can be considered properly milled in. (It is much easier and quicker to do the "milling in" while the patterns are in this stage than to wait until the dentures are finished.) There should be a definite facet in the blue inlay wax produced by each cusp of the lower posterior teeth. These facets are an accurate reproduction of the cuspal inclines of the given case (Fig. 7).

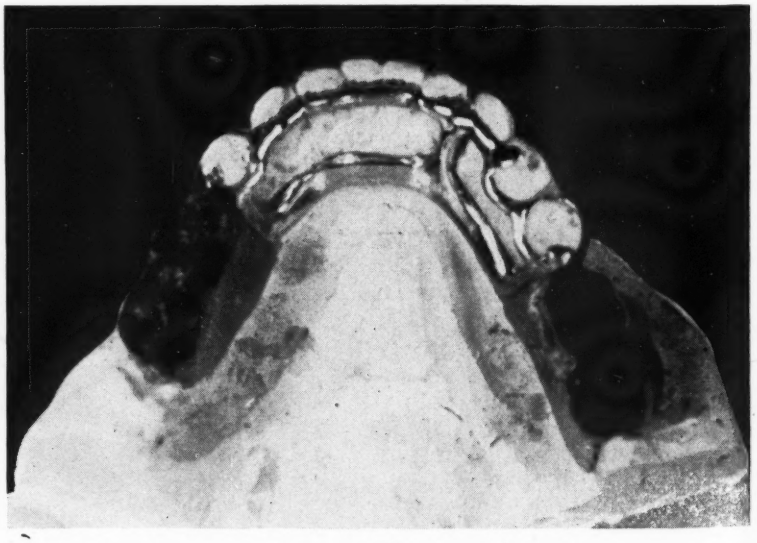
8. *Carving*—The inlay wax is now carved in such a way that there are normal escapements for food during mastication. Care must be taken not to reduce the vertical height of a cusp as it will be out of occlusion when the case is finished. Likewise, no wax should be added or the entire occlusal balance will be disrupted. When the upper posterior teeth have been carved to the satisfaction of the operator, the case is sent to the laboratory for processing (Fig. 8).

Matching Color of Buccal and Occlusal Surfaces—In packing the case, colored acrylic material is packed into the prepared posterior teeth so that the occlusal surfaces of the finished case will be the same color as the rest of the teeth. Aside from this, the case is processed in the usual way.

The laboratory should definitely be instructed *not* to polish the occlusal surfaces of the posterior teeth after processing.

To date I have been unable to match the color of the buccal and occlusal surfaces of the teeth perfectly. However, if the buccal cusps have not been reduced in their verti-

(*Continued on page* 27)



9. ***Lower partial left side "chewed in" by patient; right side carved after "chew in" and ready for processing by laboratory.***

A Problem in ARTICULATION

*Solved by Geometric Formula**

W. H. SNODDY, D.D.S., Salt Lake City

DIGEST

To refute the idea that the movements of the temporomandibular articulation should govern the placement of teeth in dentures, a dissenting view is expressed and analyzed; namely, that anterior teeth govern the movements of the mandible, when upper and lower teeth are in contact, and not any set path of the temporomandibular articulation.

RECORDING THE movements of the temporomandibular articulation appears to be considered the basic requirement for properly locating the teeth in dentures. This point of view is indicated by a careful review of the literature on complete denture restorations and a study and application of the instructions for manipulation of various articulators.

The author, however, believes that the teeth, particularly the anterior teeth, guide the movements of the temporomandibular articulation after centric and vertical have been determined.

In an endeavor to bring out the pros and cons on this subject, the analytic processes of a geometric problem are being utilized and the conclusion drawn therefrom.

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Definitions

Theorem—A statement to be proved.

Corollary—A truth that is easily deduced from a known truth.

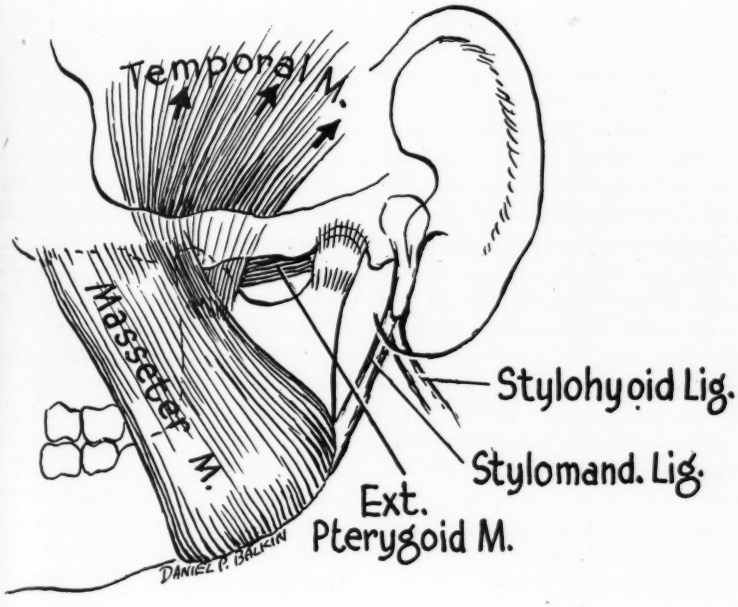
Contradictory—A theorem which must be true if the given theorem is false, and must be false if the given theorem is true.

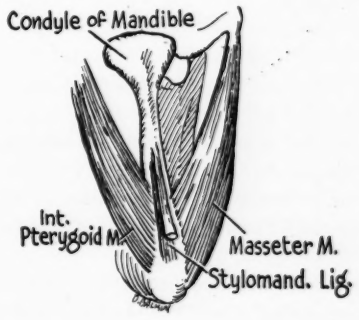
Analysis—The course of thought by which the construction of the required figure is achieved.

Proof—The solution of the problem.

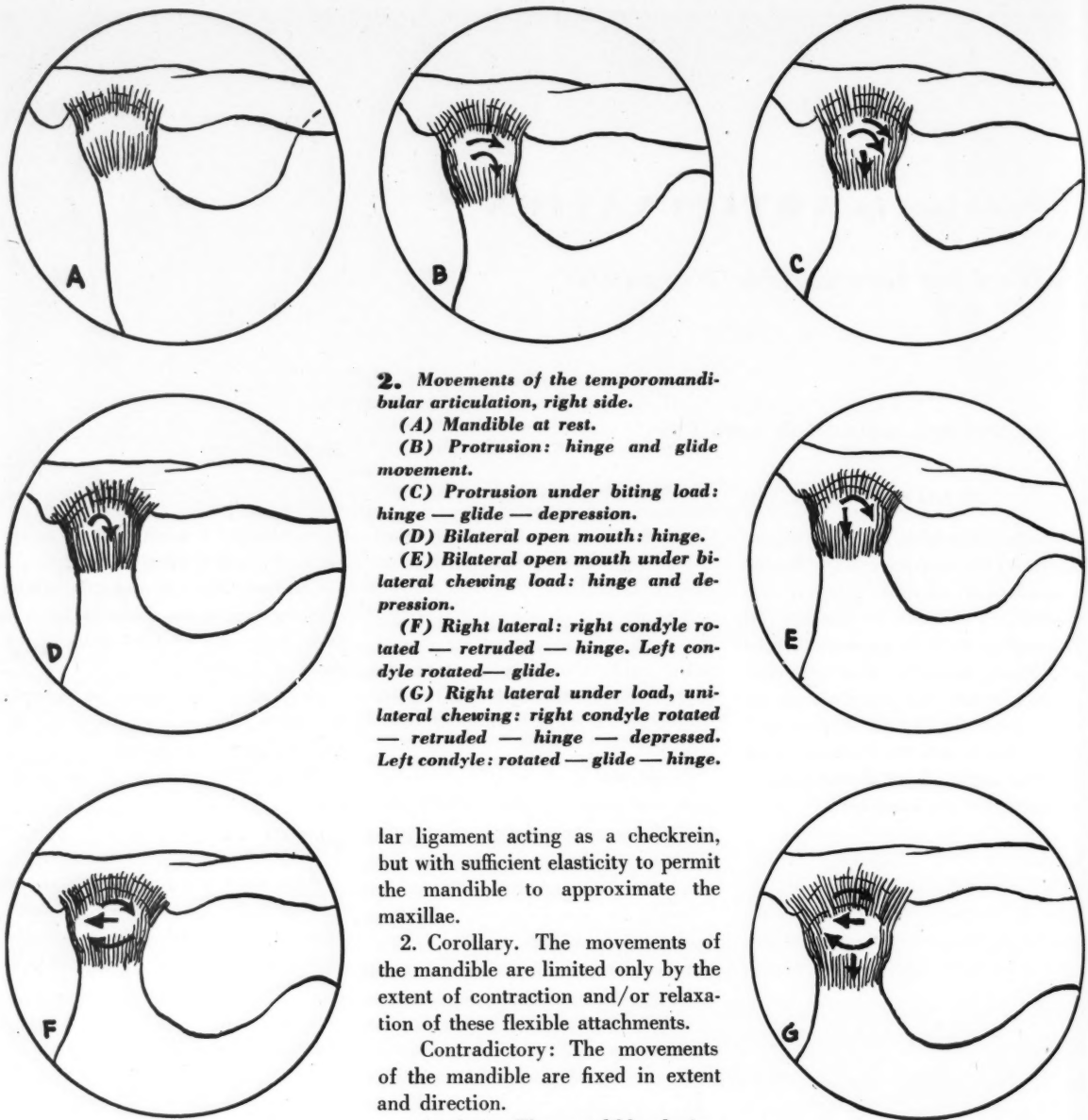
Theorem

When the upper and lower teeth are in contact, the movements of the mandible are governed by the anterior teeth present and not by any set path





1. ***Normal anatomic considerations. The mandible is swung from the skull in a flexible sling formed principally by the masseter and internal pterygoid muscles. The stylomandibular ligament acts on these flexible muscles as a checkrein but with sufficient elasticity to permit the mandible to approximate the maxillae.***



2. ***Movements of the temporomandibular articulation, right side.***

(A) Mandible at rest.

(B) Protrusion: hinge and glide movement.

(C) Protrusion under biting load: hinge — glide — depression.

(D) Bilateral open mouth: hinge.

(E) Bilateral open mouth under bilateral chewing load: hinge and depression.

(F) Right lateral: right condyle rotated — retruded — hinge. Left condyle rotated— glide.

(G) Right lateral under load, unilateral chewing: right condyle rotated — retruded — hinge — depressed. Left condyle: rotated — glide — hinge.

of the temporomandibular articulation.

1. Corollary. The mandible is suspended from the skull by flexible attachments.

Contradictory: The mandible is suspended from the skull by stable attachments.

Analysis: The mandible is swung from the skull in a flexible sling formed principally by the masseter and internal pterygoid muscles, together with the capsular ligament (Fig. 1). The two muscles are flexible and the ligament is capable of considerable elasticity, the stylomandibular ligament acting as a checkrein, but with sufficient elasticity to permit the mandible to approximate the maxillae.

2. Corollary. The movements of the mandible are limited only by the extent of contraction and/or relaxation of these flexible attachments.

Contradictory: The movements of the mandible are fixed in extent and direction.

Analysis: The mandible, during speaking, eating, and other activities moves to various extents along innumerable paths limited only by muscular action and tooth contact (Fig. 2).

3. Corollary. Without tooth guidance or other substituting appliance, the mandible can describe innumerable movements within its limitations.

Contradictory: Without tooth guidance or other substituting appliance, the mandible can move in only one path.

Analysis: Opening, closing, protruding, and lateral movements are self-demonstrable (Fig. 2).

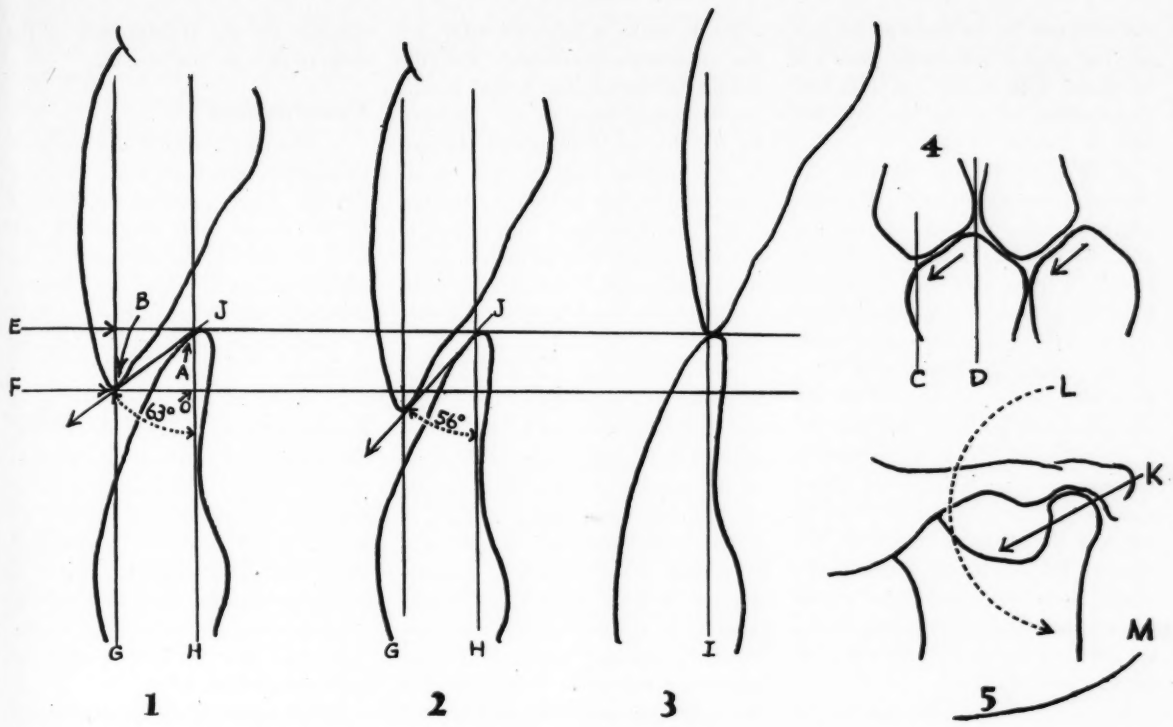
4. Corollary. The mandible must have a stop (such as the teeth) to establish and maintain a normal closure.

Contradictory: The mandible without teeth or other device can close only to a definite position.

Analysis: In edentulous cases, the mandible can be made to approximate beyond normal vertical and, in some instances, to contact the maxillae (Fig. 4).

5. Corollary. The mandible must have a guide to govern its movements from centric to eccentric.

Contradictory: The mandible,



without teeth or other appliance, can move only in one path from centric to eccentric.

Analysis: In edentulous cases, the mandible can be moved from centric to eccentric in many paths, depending on the proximity of the mandible to the maxillae (Fig. 4). Anything placed in contact between the mandible and maxillae of an edentulous case (such as bite-rims flat or curved; points operating against plates flat or curved, in any location, intra- or extra-oral) will act as a guide to the temporomandibular articulation and various readings for setting the articulator guides may be obtained. Why, then, use arbitrary guides and registrations, when a permanent guide (the upper and lower anterior teeth arranged esthetically) is available?

When articulator adjustments are set prior to arranging the anterior teeth, it is mandatory to set the anterior teeth to correspond to those settings, regardless of esthetic overlap or overjet, or else correct the articulator settings to correspond to the desired setting of the anterior teeth. Therefore, if the present-day anatomic articulator is to be used according to the instructions, the logical thing to do would seem to be to obtain the readings with the anterior teeth in place. Taking the readings with the anterior teeth in place eliminates the necessity of fixed adjustments of the various paths on these articulators, provided a flexible jointed articulator is used.

3. ***Control of articular movements by teeth.***

6. Corollary. The temporomandibular articulation, being flexible, cannot act as a stop or guide.

Contradictory: Since the temporomandibular articulation is not flexible, it can act as a stop and guide for the movements of the mandible.

Analysis: Again the ability of the mandible, in edentulous cases, to approach the maxillae illustrates the statement of the corollary.

Proof

1. Obtain a present-day anatomic articulator whose articular condyles, when freed, will maintain a neutral (centric) position.

a) Lock the condyles in the neutral position, making a straight line articulator.

b) Mount models with the bite-plates in centric position.

c) Arrange the upper and lower anterior teeth on the bite-rims in an esthetic manner. Check the esthetic effect and Gothic arch movements in the mouth to your satisfaction.

d) Return the bite-rims to the articulator and, after loosening the condyles so they will move freely with manual pressure, set up the posterior teeth so there is balanced occlusion.

e) Check this setup in the mouth for esthetics and balance.

2. Construct another set of bite-rims, using the same vertical and centric. Mount the models on the articulator and set the condyles and incisal guides according to instructions for the articulator being used. Place the first setup on the articulator. (Only by coincidence will they articulate, and that will be when the anterior teeth have been set the same in both cases.)

3. Set up another set of teeth according to the registration on the articulator. Again only by coincidence will the esthetic appearance of

the anteriors be the same as the first set. The most demonstrable cases will be those with end-to-end bite and those calling for an extreme over-bite and/or overjet.

4. (Fig. 3) In this diagram (1) shows an average overbite and overjet; (2) a more pronounced overbite; and (3) an end-to-end arrangement. It will be noted that vertical parallel lines have been drawn through the center of the incisal edge of all teeth. A line joining the bisection of these lines with the incisal edge of the upper and lower indicates the path the lower teeth will take in the protrusive movement. The amount of down thrust is governed by the overlap; the forward thrust is governed by the overjet. The downward thrust is obtained by a hinge movement of the temporomandibular articulation, and the forward thrust by forward gliding motion (5-L-K).

In other words, the protrusive movement is made by a combination of the hinge and gliding movements, in most cases acting simultaneously. The degree of angulation of the protrusive movement is governed by a combination of the overlap and overjet as shown in (1) and (2) in Figure 3. In the end-to-end case, there is no hinge motion. The degree of hinge motion is the same as the degree of downward and forward thrust of the lower anteriors from centric to protrusion, and the distance of travel of the condyle in its gliding movement is the same as the forward distance the lower tooth travels (H to G).

If the posterior teeth were a continuous flat surface, it would be necessary to bend this flat surface in an upward curve (M) anteriorly-posteriorily to the same degree as the angle of downward and forward thrust of the lower as shown in (1) and (2), or in the case of (3) it would lie parallel to the plane of occlusion. As the posterior teeth have incline planes, the degree of curvature is altered to the degree of angulation of these planes (4). If the excursion from D to C (4) is the same angulation and same distance as A to B (1), then the posterior teeth would be set vertical to the plane of occlusion in order to make a balanced setup for the protrusive movement. For the lateral movements the lateral incline planes would likewise be governed by the degree of angulation formed by the anterior teeth in their excursion from centric to lateral eccentric.

5. If an articulator with a flexible condyle is used, with no incisal guide, the arrangement of the anterior teeth will guide the condyle in all its movements. If it is desired to have a fixed, definite path for the condyles to follow, the angulation of this path can readily be obtained by pre-extraction measurements, or measurements of the anterior setup where pre-extraction records are not available.

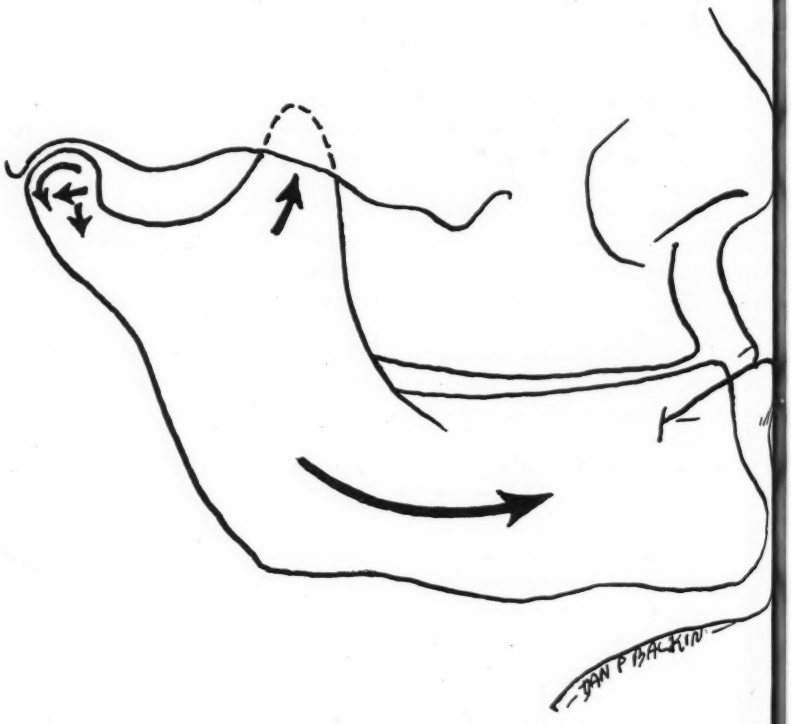
The angulation of the condyle movement is determined by measuring the distance from G to H and from E to F, plotting the rectangle E-A-O-B, drawing the line J, and measuring the angle EAB (1). Set the articulator condyle reading and the incisal plate reading accordingly, and you will have the most accurate settings for the arrangement of the teeth in that particular case.

Conclusions

1. The movements of the temporomandibular articulation are free and flexible. These qualities are depicted by the innumerable arcs which can be described by the mandible in an edentulous case; they are demonstrated by the ability of the mandible in such cases to approximate the maxillae.

2. When the natural dentition is present in the mandible and maxillae, the upper and lower teeth, in contact with each other, guide the movements of the temporomandibular articulation. (If you have natural dentition, slide your teeth forward to a protrusive position. You will feel the guiding effect of the anterior teeth; your mandible can follow only the path provided by them.)

3. All adjustments on articulators are governed by the incisal guide, as demonstrated by the fact that the



4. *As the mandible approaches the maxillae, the body moves forward and upward; the coronoid process moves upward and backward; the condyle rotates distally, is retruded and depressed.*

upper and lower anterior teeth can be placed in only one relationship when condylar registrations are used; whereas, if a flexible condylar joint is used, the anterior teeth may be set in any desired relationship and the posterior teeth set accordingly will produce a balanced functional occlusion. The instructions for one of the most popular articulators states: "With the adjustments completed, the six maxillary and six mandibular anterior teeth are set up to comply with the requirements of esthetics and phonetics. After checking this setup in the mouth to satisfy appearance, etcetera, the incisal guide of the articulator is adjusted to conform to the articulation of these anterior teeth. The posterior teeth are arranged so that the opposing cusp inclines remain in contact, while the articulator performs excursions and guides the setup of the teeth." In other words, the incisal guide merely duplicates what is already present.

4. Since the anterior teeth are the guiding factor, charts of temporomandibular movements and their subsequent transfer to articular condyles are unnecessary, provided a flexible condylar articulator is used.

5. Determination of the downward and protrusive and/or downward and lateral angulations of the lower anterior teeth in relation to the upper anterior teeth are the ultimate determining factors of functional occlusion of the teeth, as demonstrated in the foregoing discussions.

6. The utilization of the anterior teeth, arranged esthetically and in accordance with the Gothic arch movements, is the only requirement for producing functionally balanced dentures, as demonstrated by the mathematical and engineering principles in Figure 3.

7. If the problem, proof, and conclusion herein depicted are erroneous, then (1) an anatomic articulation may be set to movements of the mandible as obtained in accordance with the instructions for the particular articulator; (2) the anterior teeth may be set for esthetics without consideration of these registrations; and (3) a balanced functional occlusion may be obtained without any change of the position of the anterior teeth. This, in itself, being contrary to such instructions is additional proof of the theorem.

Regional Office, Veterans Administration.

Improved Prosthetic Occlusion (*Continued from page* 22)

cal height, the new acrylic is not visible from the buccal aspect and the occlusal surfaces are not seen in normal use. For this reason I make the occlusal adjustments on the upper posterior teeth and not the lower.

In making a lower denture opposed by the patient's natural upper teeth, I have made the occlusal adjustment on the lower posterior teeth. The end result was the same in spite of a slight variation in color. I have never had a patient object to the difference when the procedure was explained to him beforehand. This same procedure works equally well in partial cases (Fig. 9—left side chewed in; right side carved).

Comment

The reader may contend that this procedure will consume too much time. My experience is that each step except the final carving can be done by the assistant; and a competent technician can carve the occlusal surfaces if the dentist does not care to do it himself. I find that it takes no more time than to carve the occlusal surfaces of fixed bridge pontics. The improvement in occlusion and the greatly reduced number of adjustments that are required after the denture is completed has made it well worth the additional time consumed.

513 *Trust Company Building.*

ANNOUNCEMENT OF BOOKS RECEIVED

COLLECTED LECTURES: A STUDY OF THE FUNDAMENTAL PATHOLOGY OF PERIODONTAL DISEASE, By James Nuckolls, D.D.S., and Robert W. Rule, Jr., D.D.S., San Francisco, Lithotype Process Company, 1947, Price $3.50.

THEORY AND PRACTICE OF CROWN AND BRIDGE PROSTHESIS, By Stanley D. Tylman, A.B., D.D.S., M.S., Second Edition, St. Louis, The C. V. Mosby Company, 1947, Price $12.50.

COMPLETE DENTURES, By Merrill G. Swenson, D.D.S., Second Edition, St. Louis, The C. V. Mosby Company, 1947, Price $12.50.

DENTISTRY FOR CHILDREN, By J. C. Brauer, D.D.S., A.B., M.Sc.; L. B. Higley, B.A., D.D.S.; Maury Massler, D.D.S., M.S.; and Isaac Schour, D.D.S., Ph.D., D.Sc., Second Edition, Philadelphia, The Blakiston Company, 1947, Price $8.50.

PHARMACOLOGY AND PHARMACOTHERAPEUTICS FOR DENTISTS, By William H. O. McGehee, M.D., D.D.S., and Melvin W. Green, Ph.G., B.S., Ph.D., Third Edition, Philadelphia, The Blakiston Company, 1947, Price $6.50.

PRACTICAL FULL DENTURE PROSTHESIS, By Joseph S. Landa, D.D.S., First Edition, Brooklyn, New York, Dental Items of Interest Publishing Company, Inc., 1947, Price $9.50.

YOUR TEETH AND HOW TO KEEP THEM, By Jerome J. Miller, D.D.S., New York, Lantern Press, Inc., 1947, Price $3.00.

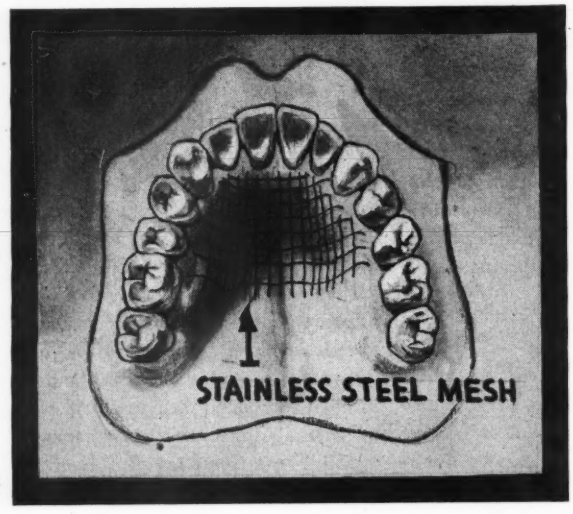
Clinical and Laboratory

1

Removing Amalgam from Diamond Instruments

Francis J. Loughlin, D.D.S., Woodhaven, New York

1. If a diamond instrument is contaminated by touching amalgam during cavity preparation, the amalgam may be removed from the instrument by soaking overnight in chemically pure mercury.

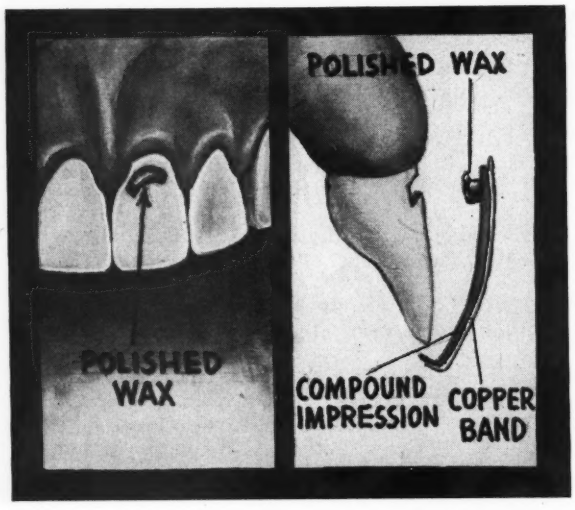


2

Denture Reinforcement

W. D. Marston, Montreal

2. A stainless steel mesh imbedded in the palatal portion of a full upper denture will reinforce this portion and prevent some fractures in the median line that often result from resorption of the ridges and some lateral stresses during mastication.



3

A Matrix for Gingival Silicates

N. E. Birn, D.D.S., New York City

3. After the cavity is prepared, place wax in the cavity, contour, and polish with wet cotton. Adapt a piece of copper band to follow the outline of the labial surface. Festoon one millimeter below the gingival. Using modeling compound, take an impression of the labial, incisal, and two millimeters of the lingual surfaces. Chill and withdraw. Remove the wax that had been adapted in the cavity. Place silicate in the cavity; return compound impression to the original position. This matrix will assure clean and well-condensed silicate.

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For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10.00 on publication.

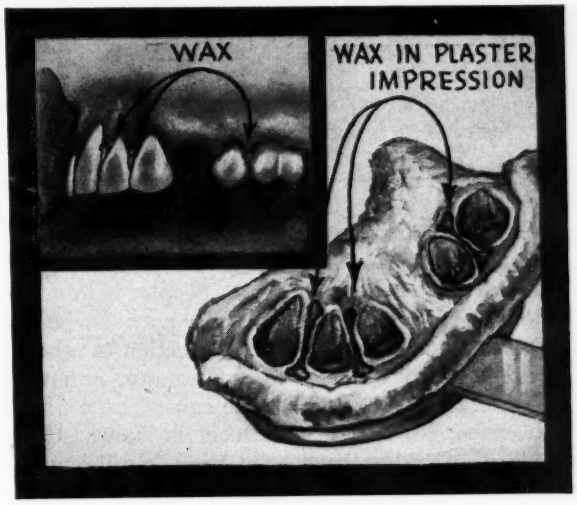
You do not have to write an article. Furnish us with rough drawings or sketches, from which we will make

SUGGESTIONS . . .

A Fixed Bridge Impression

Kenneth Smith, D.D.S., Binghamton, New York

4. Before taking a plaster impression for a fixed bridge, fill the interproximal space with soft wax. This facilitates removal without fracture and assures an accurate impression of the interproximal spaces.

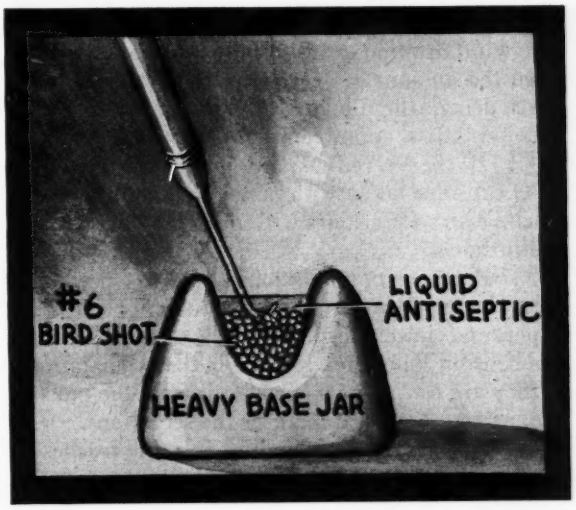


4

Cleaning Scalers

F. A. Lemoine, D.D.S., Shreveport, Louisiana

5. A glass jar with a heavy base is half-filled with number 6 shot and the shot covered with antiseptic solution. The jar is placed on the bracket. During treatment, the scalers are dipped in the jar. The shot acts as an abrasive to remove the debris from the scaler points. When the operation is completed, the jar is held under the water faucet to flush out the debris. The jar and shot are then placed in the sterilizer.



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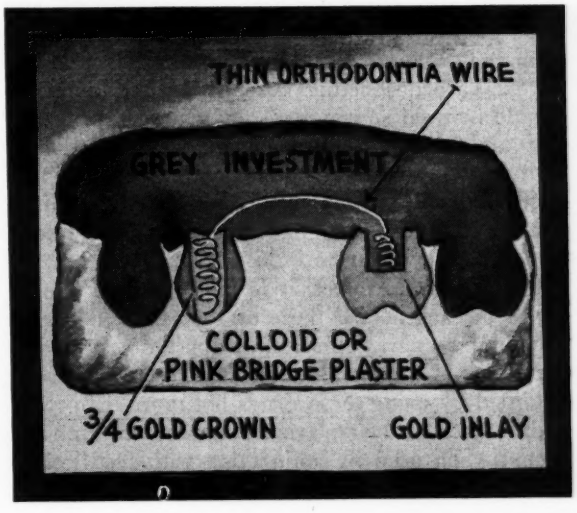
Reinforcing Bridge Models

George M. Witter, D.M.D., Spokane

6. Place the abutment inlays or crowns in position. After the impression has been made, twist thin orthodontia wire around the shank of a straight handpiece bur, forming coils of wire. Place these coils inside the inlay or crown in the impression. One continuous wire may be used. Pour investment carefully until the wire is secure. Then add remainder of the material for bulk. The wire will gave added strength while the pontic is being fabricated and constructed.



6

suitable illustrations; write a brief description of the technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 34 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S *Page*

THIS IS the time of year when the common cold disrupts business and social life. The dentist, because of his close contacts with people, is in a position to become easily infected. He may also be the offender in communicating the infection to others.

The etiology of the cold is unknown, although it is generally considered to be caused by a filterable virus. No specific treatment is known. Hundreds of remedies have been tried, mostly to no avail. According to Randolph,[1] the following measures have been found helpful in the *symptomatic* treatment of colds:

"1. If the secretions are copious, one APC capsule with atropine every six to eight hours will reduce the amount of secretion. (Each capsule contains acetylsalicylic acid 0.25, phenacetin 0.25, codeine 0.016, and atropine 0.0005 gm.)

"2. If the secretions are not excessive, plain APC capsules taken with or without sodium bicarbonate every four hours will make the patient more comfortable.

"3. Plain steam inhalation for five to ten minutes every hour or two loosens the secretions in both upper and lower respiratory passages. Camphor and benzoin should not be used in these inhalations, as they are drying agents which irritate the mucosa and, as an aftereffect, increase the secretions.

"4. For a cough, ammonium chloride troches or elixir of terpin hydrate with codeine are useful in loosening the cough or checking the cough, respectively.

"5. Warm, moist compresses over the eyes and the frontal and maxillary sinuses may reduce the pain and discomfort in these regions.

"6. Vasoconstricting nose drops and inhalants should be used sparingly. They give temporary relief and promote drainage for the moment but irritate the mucosa and increase the congestion if used frequently. They should be used, if at all, in a mild form, such as ephedrine 0.5 per cent solution, or neosynephrine 0.25 per cent solution. To get the maximal effect, it is best to instill 2 or 3 drops in each nostril three or four times a couple of minutes apart. This allows for the progressive shrinkage of the membranes. The best results were obtained by using these drugs not more than twice a day, preferably on arising and before retiring, except when used in conjunction with instillations [for chronic sinusitis] . . ."

In an ordinary cold the nasal secretion usually runs a course from serous to mucoid to purulent. Serious complications may arise from this purulent yellow discharge. To prevent nasal, sinus, and lung complications, Randolph suggests that the cold sufferer must break himself of "the time-honored habit of nose blowing. This habit must be broken because blowing creates positive pressure in the upper respiratory passages. There is always a certain amount of secretion about the small openings of the nasal sinuses which is forced back into the sinuses by blowing. The mucosa of sinus cavities is ciliated. The cilia set up a current in the direction of the sinus openings. This is the normal excretory mechanism of the sinuses. When the mucosa is congested, this mechanism is impaired. By blowing the nose, more and more secretion is forced back into the sinuses, the excretory mechanism fails, and the sinuses become plugged with the secretion, thus establishing a fertile field for secondary invaders. There is a thickening of the exudate, which further impedes drainage, causing differential air pressure within the sinuses, attendant pain, and eventually complications.

"Forceful inhalation or sniffing, on the other hand, creates negative pressure, and, instead of forcing the secretions back into the sinuses, helps to draw them out, thus aiding the normal excretory mechanism. It is deemed best from a public health point of view and perfectly harmless to swallow the secretions sniffed, although if they can be properly disposed of they may be expectorated. The front part of the nose should be cleaned mechanically with any kind of soft tissue papers on the market, as these cause less excoriation of the mucosa than does the rougher material of a cloth handkerchief."

From a social choice, there is little difference between "blowing" and "sniffing;" they are both objectionable. As forceful inhalation, or sniffing, aids in the natural excretory process, it is the method to select. Until we know more about the common cold, all treatment must be empiric.

An item in the current department, MEDICINE AND THE BIOLOGIC SCIENCES, suggests that human blood serum globulin may contain antibodies that are defensive to the common cold.

[1]Randolph, A. C.: Care of the Common Cold, Bull. U. S. Army M.D. 7:857-860 (October) 1947.

MEDICINE and the Biologic Sciences

Leukotomy (Psychiatry)

A dramatic surgical operation has been developed in the past ten years. Its purpose is to relieve psychotic patients and some patients with neurotic reactions from symptoms that are deemed to be persistent and not amenable to treatment of less dramatic nature.

The operation is known as "prefrontal lobotomy" or "leukotomy." Technically, the purpose of the operation is to cut the white matter of the frontal regions from its connections with the thalmus.

Authorities are not certain as to just why patients benefit at all and to what extent they benefit from this heroic procedure. It seems apparent that leukotomy reduces only quantitatively the neural mechanism for the associative functions. Further neuroanatomic and neurophysiologic research will perhaps give the answer.

Following a successful operation the emotional intensity and coloring of the ideas, hallucinations, or somatic sensations that have plagued the patient subside to a low level. In some cases the symptoms disappear entirely.

The operation is standarized to a large degree. However, the most important point in technique is that the more posterior the plane of section, the less likely is the patient to make an even partial social readaption.

Even in the most successful case the patient is not benefited to the point of complete cure. He may lose all or most of his psychosis but he will pay for it with more or less profound changes in his personality. It is noted that most persons are left with a definite loss of initiative and a shallowness of affect. Frequently euphoria, procrastination, factiousness, increased appetite, laziness, and tactlessness arise. Even with these sequelae many patients return to some sort of work quite well. The intellectual assets are not diminished and behavior is apparently not greatly altered.

Best results are secured in long-standing depressions, particularly of the involutional and agitated types, in obsessive-ruminative-tension states, and in certain types of schizophrenia.

Leukotomy is contraindicated in the presence of organic deterioration of the brain, cerebral arteriosclerosis, and senile degenerative processes.

The postoperative and convalescent complications usually are confusion, restlessness, epileptiform convulsions, urinary frequency, and incontinence. These disappear within a few weeks or a year. The operative mortality is less than 3 per cent. In general, statistics show some degree of improvement in 50 per cent of cases.

In reality leukotomy is an operation of amelioration and not cure. It should be limited to patients who may be considered "wrecks of human nature." The patient who is subject to manic-depressive reactions of great sweep and intensity may be helped with surgery.

Even though leukotomy has been in practice for only a few years it certainly is a forward step by which some chronic mental invalids may attain contentment and freedom from harassment that is otherwise impossible.

Williams, V. P.: Psychiatry, New England J. Med. 236:322-326 (*February* 27) 1947.

Asthma— New Concepts

Truly speaking, the term "asthma" denotes a symptom and when used alone it has little significance. Proper designation demands that one should know what kind of asthma the particular case presents and what causes it.

Probably the most vital point in diagnosis is the age when the condition arises. As a generalization it can be stated that when the asthma begins before the age of thirty, the cause is allergy; but when asthma appears after the age of forty the cause is not allergy. This rule applies quite well with a small percentage of exceptions.

Asthma occurring in young people depends on allergy. This allergy is due to dust more than foods. Therefore, a painstaking and accurate history is necessary to determine the precise cause. Skin tests have their limitations because a patient may be clinically positive but show no positive tests.

There are some young patients, as well as older ones, who have asthma only three or four times a year. This asthma always seems to be associated with a new infection, usually a head cold. It is believed that these patients are slightly sensitive to a food or dust but not enough to show symptoms at all times. Any new cold tends to lower the threshold, enabling the slight allergy to become clinically effective.

In the older persons the problems are not as easy or well-defined. It is doubtful that a person suddenly develops an allergy in middle life or later. Occasionally there is clear evidence of an infectious process in the sinus or bronchi or both.

It is thought that an important factor in causing asthma in the older persons is "depletion." The tired business man or the overworked housewife may be affected. Their depletion is often psychic as well as somatic.

Infected teeth, infected gall blad-

der, a chronic prostatitis, or a chronic bronchial infection often play a part in bringing about a body depletion, thus allowing an allergy to arise.

Lesions of the sinuses are very common. They may be considered as a part of the process and not a cause of it. Surgery on the sinuses may do more harm than good. In fact, even polyps are left alone in most cases to good advantage.

Treatment today is based on a consideration of the patient as a whole and not on the symptoms alone.

Rackermann, F. M.: New Concepts of the Causes of Asthma, J. Michigan M. Soc. 46:328-329 (*March*) 1947.

RH Factor in the Blood

The first description of the Rh factor appeared in 1940. Since then it has been found to be an agglutinogen which is present in the erythrocytes of approximately 85 per cent of Caucasion people regardless of sex or primary blood groups. There is wide variation in the incidence of the Rh factor in different races.

The clinical importance of the Rh factor lies in the fact that certain persons who lack it are capable of being sensitized by blood containing the Rh factor. Antibodies are produced by the Rh negative persons against the Rh factor when these persons are sensitized.

For determination of the Rh factor a human serum is used. For this purpose human serums are found to be of three varieties: One giving reactions approximately 85 percent positive is designated anti-Rh$_o$ serum; another giving reactions 70 per cent positive is designated anti-Rh′; the third type of human serum gives reactions 30 per cent positive and is termed anti-Rh″.

These three human serums, which contain specific agglutinins, are used to detect the presence or absence of the corresponding antigens or Rh factors in blood. The antigens are termed Rh$_o$, Rh′, and Rh″. Because of the possibilities of various combinations of these three factors, it is found that eight standard types or subgroups of the Rh factors are recognized.

For clinical purposes, there are four types of blood which should be considered Rh negative. These are Rh, Rh′, Rh″ and Rh′Rh″. Persons with blood of any of these types should be considered as Rh negative when they receive transfused blood or present obstetrical problems concerned with the Rh factor.

However, when these persons serve as donors, blood should be obtained only from persons whose blood is type Rh when Rh negative blood is desired. Rh′ and Rh″ types may cause severe reactions if transfused to persons sensitized to these factors.

Approximately 15 per cent of Caucasians are Rh negative. Their blood congenitally lacks the Rh factor, the antigen serving as an agglutinogen. Rh negative persons are in danger of being sensitized when they receive transfusions of Rh positive blood. Such a sensitization consists of a tendency of anti-Rh agglutinins to develop in the recipient's blood. If more Rh positive blood is administered later, an agglutinization of the Rh positive erythrocytes being administered is probable. This reaction is serious and often fatal.

The Rh factor is of utmost importance in obstetrics. It is possible for the Rh negative pregnant woman to become sensitized through pregnancy or transfusions of Rh positive blood. The mother may not be affected but the fetus or infants born in subsequent pregnancies may be seriously affected by a disease variously known as "hemolytic icterus and anemia of the newborn," "erythroblastosis foetalis" or "congenital hemolytic disease."

The cause is due to the anti-Rh agglutinin passing readily into the fetal circulation during the latter part of pregnancy. The erythrocytes of the baby undergo agglutinization and hemolysis which lead to severe anemia and jaundice.

The percentage of Rh negative women who become sensitized to the Rh factor by pregnancy is from 2-5 per cent of those becoming pregnant, depending upon the number of pregnancies. However, the number sensitized by Rh positive blood is higher.

Stillwell, G. C.: Laboratory Aspects of Rh Factor, Medical Clinics of North America 31:787-798 (*July*) 1947.

Hunt, Arthur B.: Rh Factor—Relation to Transfusion and Importance in Obstetrics, M. Clin. North America 31:779-802 (*July*) 1947.

Functional Nervous Disease

The so-called "functional" disturbances are the most baffling disorders of the personality. Serious derangements of function are present but no chemical or structural changes are detectable in the brain tissue. Such changes may be present but their detection is extremely difficult.

The problem created by functional nervous disorders is more than a medical problem. It is a social, eugenic, and economic problem as well. Today there are more hospital beds being occupied by persons suffering with nervous diseases and mental ills than from all other diseases combined.

Neuroses are comparatively mild but exceedingly common disorders. There are a great many manifestations: anxieties and fears which seem unreasonable and unfounded; excessive shyness or aggressiveness; undue concern about the body and its parts so that common and mild discomforts are sensed as very uncomfortable or even painful. Often emotional disturbances may truly have harmful effects on the body, notably in the form of digestive and cardiac dysfunctions.

Many observers believe that neurotic manifestations frequently arise from deep-seated inner conflicts. The individual may not recognize or even suspect the presence of such a conflict. It may be repressed and unrecognized and its expression may result in emotional disturbances and neurotic manifestations.

The more serious disorders of the "mind" and the emotions are the psychoses. These represent an exag-

On the Dual Value of *Candy*

Socially candy has long been accepted as a pleasant part of our daily lives. From early childhood on, candy is considered an appropriate accompaniment of the festive spirit of birthdays, holidays, anniversaries, and other joyous occasions.

In recent years, with the advancing knowledge of nutrition, the values of candy as a worth-while part of the daily diet have also become recognized. Most of the kinds of candy manufactured today are made of a number of valuable foods which contribute to the extent they are used to the satisfaction of many nutritional needs.*

Whether enjoyed as a delectable tidbit during a friendly gathering—or served at the end of a family meal—or eaten as a quick energy food following strenuous activity, candy has a unique and valid place in the human dietary.

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*The candies in the manufacture of which milk, butter, eggs, fruits, nuts or peanuts are used, *to this extent* also (a) provide biologically adequate proteins and fats rich in the unsaturated fatty acids; (b) present appreciable amounts of the important minerals calcium, phosphorus, and iron; (c) contribute the niacin, and the small amounts of thiamine and riboflavin, contained in these ingredients.

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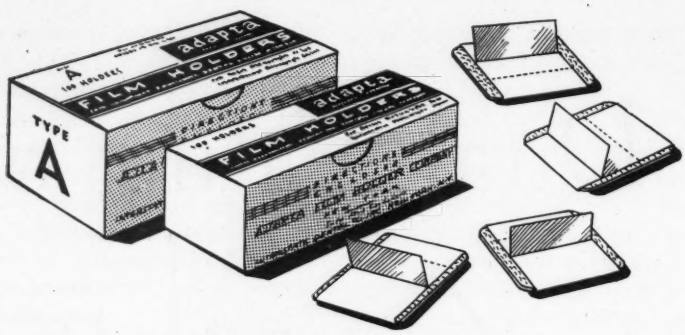

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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 28 *and* 29)

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708 Church Street
Evanston, Illinois

From: _____

_____

Subject: _____

Explanation of Procedure:

Sketch:

$10 will be paid to author on publication of accepted suggestions.

generation of perfectly normal tendencies. The manic-depressive psychotics are so emotionally unstable that they experience marked mood swings from months of depression to long periods of excitement or vice versa.

It is quite easy for the mentally sick to become fixed upon some feeling or emotion so that it acts as the dominating influence in their behavior. Even the pleasant daydreams we all experience become more real to the mentally sick than true realities.

In these mental disorders all degrees of malfunction are found: Some are barely perceptible; others mildly exaggerate one thing or another with little or no interference to normal daily living activities; and others are completely disorientated in time and space and social relationships.

Just as there are many degrees of malfunction so there are many degrees of amenability to effective treatment. Some are restored to a normal useful life and others decline progressively.

Carlson, A. J., and Johnson, Victor: The Machinery of the Body, Chicago, University of Chicago Press, 1947. *pages* 440-442.

Dental Aspects of Pulmonary Tuberculosis

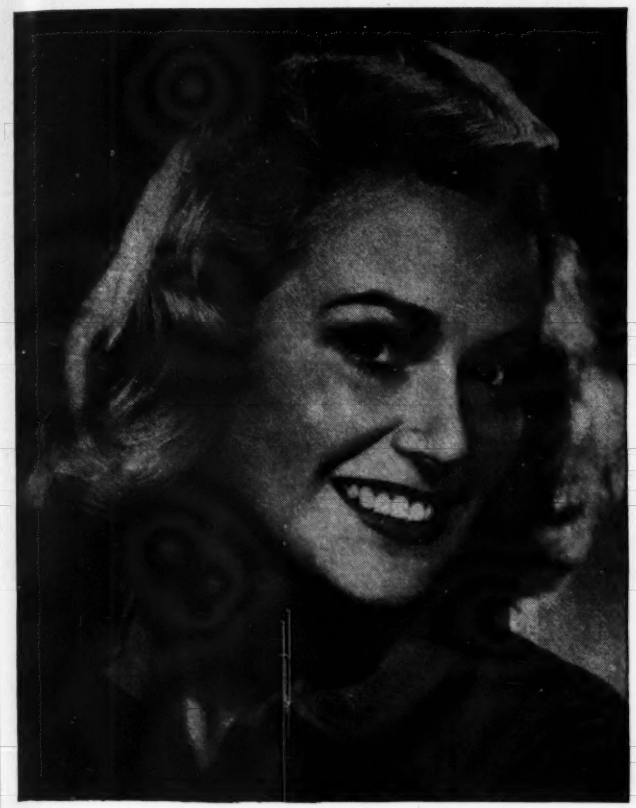
There does not seem to be any significant increase in dental caries or erosion in the presence of pulmonary tuberculosis. Occasionally an increase in caries is noted, probably due to lozenges used by patients, which contain carbohydrates.

There is little or no increase in periodontal disease. Ulcers of the tongue and mucous membrane are rare. The incidence of Vincent's infection is not greater than that found in nontuberculous persons.

Every effort should be made to maintain the general state of health at its highest level. The vitality of the mouth should be at its best so that bacilli have no opportunity to find areas of lowered resistance.

Primary tuberculosis of the oral cavity and upper respiratory tract is

(*Continued on page* 36)



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(*Continued from page* 34)

rare. The majority of lesions in the oral cavity are secondary to a primary tuberculosis in the lungs. It is possible for oral lesions to arise from bacilli in sputum, blood stream, and lymphatic stream.

The incidence of oral tuberculosis in cases of pulmonary tuberculosis is generally quite low. Figures vary from 0.4 per cent to 1.4 per cent. The typical manifestation in the mouth is the presence of ulceration of varying degree. Some ulcers are small and others large enough to require excision. The prognosis is favorable if the patient is able to overcome the pulmonary disease.

Comroe, B. I.; Collins, Leon H., and Crane, M. P.: Internal Medicine in Dental Practice, ed. 2, Philadelphia, Lea & Febiger, 1942, *pages* 124-129.

Gamma Globulin in Colds

The common cold is presumably caused by unknown viruses. From a series of experiments conducted in the Department of Pediatrics at the University of Minnesota, clinical evidence is presented to show that human serum globulin contains antibodies against the common cold.

Medical students were selected for the tests. They were divided into groups based on their past experiences with acute respiratory infections. One half of each group was used for experimental study and the other half for controls.

In the group selected for study each student received an initial dose of 6 cubic centimeters of concentrated gamma globulin intramuscularly in October. Four of the same solution were administered at monthly intervals until a total of 30 cubic centimeters in seven inoculations were given each student.

Careful records were kept of the occurrence and severity of attack of respiratory disease in both the experimental and control groups. In the nontreated group the number and severity of the attacks were identical with those of previous years. In the experimental group it was found that the human gamma globulin reduced the incidence of attacks of acute respiratory diseases by about 40 per cent with a parallel reduction in the severity of individual cases.

It still remains to be determined whether the effective antibodies are specific or nonspecific for the corresponding viruses. However, the favorable results warrant serious consideration of the gamma globulin for use in procedures dealing with the common colds.

Current Comment, Gamma Globulin vs. the Common Cold, J.A.M.A. 134: 293 (*May* 17) 1947.

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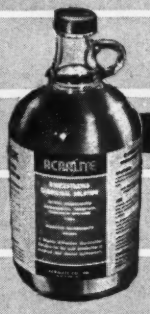

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Thumb-Sucking

C. W. GRAVES, M.D.; S. W. CHASE, M.D.; and J. W. RICHARDSON, M.D., Cleveland

EXPERIMENTAL psychology reveals that the normal child spends between 70 and 130 minutes per day sucking a nipple. Less than 70 minutes usually leads to thumb-sucking; more than 130 minutes rarely is followed by the thumb-sucking habit.

If an impatient mother thinks ten minutes per feeding is adequate, she may inadvertently be rearing a child who will find some way to make up the difference between his allowable sucking time and his actual need.

Enlarging the holes of a rubber nipple to facilitate the passage of milk or other fluids through it is a common practice of parents who seek to hurry the child's feeding time. But who wants to be rushed through his meals? Neither does the child.

—From *The Bulletin of the Cleveland Dental Society* 3:8 (December) 1947.

Contra-Angles

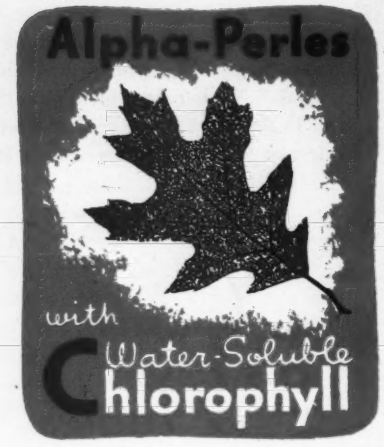
By Appointment To His Majesty

A coat of arms on a package of soap or a can of soup is worth a couple of extra cents of some people's money. The imprint that indicates that his majesty drinks a certain kind of liquor or uses a particular brand of blanket for his royal frame seems to be extra money in the till for the producers. Whether his majesty gets a percentage cut we do not know. Although we have no king to write indirect testimonials for us, we have the bad habit in another form: We have moving picture people, professional athletes, and "men of distinction" peddling products to us.

I prefer the quality to be actually in the specific product rather than just theoretically in some person identified with the product! I haven't the slightest interest in what cigar Miss Pretty Puss of Hollywood smokes unless that cigar is one that I like for reasons of its own. Nor do I feel that one bit of good is added to a whiskey merely because some Fancy Dan endorses the brand. If it is rot gut to me, no endorsement makes a difference.

The latest in the endorsement list of his majesty is a toothbrush that sells for $1.25—a stiff price, by the way, even for a stiff brush. Whether the price includes the royal coat of arms on the handle, I do not know.

Royalists and snobs are not the only ones who are taken in by this endorsement-appointment kind of sell-



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ing. Good, down-to-earth people who are striving mightily to be released from their humdrum world tend to identify themselves in fantasy with the people that they would like to be. Everybody has a bit of this "playing house" twist in his character. No one can deny that at some time he hasn't done a bit of day dreaming and pictured himself running one hundred yards for a touchdown, leading the charge of the light brigade, or having a quiet moonlight tryst with Hedy Lamarr. (My own middle-aged fantasy, by the way, leans to the latter type; how about yours?).

If using the same kind of toothbrush that a king uses gives a pleasant sense of identification that encourages the person to brush his teeth oftener and better, the fantasy that grows from this situation is perfectly harmless. If the working girl lifts herself to pleasant heights and raises her self-esteem by smoking the same kind of cigarette as the Hollywood babe, that is fine. Or, if a gentleman feels better with the liquor that is identified by name with some important-looking fellow, that is the booze for him to buy.

Suggestion, identification, relationships, non-objective values color all our behavior. Whatever makes us feel good about ourselves and about the world is the thing to encourage, provided we are not fooling ourselves or hurting somebody. A little dash of fantasy is good for everybody. What worries me is: Who can endorse something that will help a poor king feel better?

Old Doc Brady Finally Makes Sense

For years I have been carrying on a one-man war against old Doc Brady, the health columnist. Brady seems to be getting more sense—or maybe I am getting more tolerant. Better still, maybe the years are making us both mellower. Although old Doc still has his own vocabulary of diseases, such as "cri" for the common cold, "rheumatiz" for rheumatism, and still writes in a manner half-oracular and half-Dutch uncle, he recently came up with a good column on dental function:

"Believe it or not, my first thought

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concerning the teeth and rheumatiz is not whether one or more teeth may possibly harbor a septic focus, a little abscess, or an area of infection which is the source of the joint infection.

"No, there is another and, in my opinion, far more important relation between the teeth and rheumatiz which, I am afraid, most physicians and dentists fail to consider.

"When an individual subject to rheumatiz mentions casually that he has had most or all of his teeth removed at the order of a physician who reached that verdict after a cursory inspection of the mouth, one wonders whether that physician knows what function teeth serve.

"One also wonders what sort of wishy-washy training could have made a dentist perpetrate the atrocity in blind deference to the doctor's command.

"One yearns to knock their heads together and give 'em shovels and put 'em at some work they are qualified to do.

"The first thought of everyone who is seriously concerned about health or the lack of it should be about the functional efficiency of the teeth—the natural teeth or the artificial dentures installed by the dentist.

"Upon the efficiency of the mastication or chewing process depends good digestion, the assimilation of the minerals and vitamins of food as well as the calories.

"Upon assimilation depends good nutrition and upon nutrition depends the general health, vite, and longevity."

Belding on Dentistry for Children

This is not a book title but the essence of an article that appeared in *Hygeia* September 1947 written by Paul Belding, Editor of *Dental Items of Interest*. Paul's article, MISPLACED SYMPATHY, is the story of a boy and a dentist. It is the story of a boy who misbehaved in the dental office because of an overprotective mother and of the favorable change in the boy's behavior when he was made self-reliant.

It is good to see a sensible story written by a dentist appearing in a

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widely read health magazine. More power to dental educator-writers like Paul Belding.

Nutrition Notes

Now that the holidays are over and turkey has gone from the family dinner table, but unfortunately remains on the dental banquet menus, you may be glad to know that this fowl is rich in thiamine as well as protein. If you are given a slice of the skin to eat, you will be relieved to learn that you are getting a more generous dose of thiamine than the diner who has the choice parts nearer the bone. Roasting results in a thiamine content loss of more than one-half from the dark meat, more than one-third from the light. In case you have been looking for an argument against warmed over turkey, I am sorry to report that there is no further thiamine loss on reheating.

You will also be glad to know that the "hearts" of vegetables are less nutritious than the outer layers that are usually thrown away. I am indebted to the *Journal of the American Dietetic Association* for these facts:

"Vegetable wastes such as outer leaves and tops have been found to be sources of highly nutritious animal foods or supplements to human diets. A meal made from the waste outer leaves of Florida celery, for example, has proved superior to alfalfa-leaf meal as poultry or livestock feed. Moreover, alfalfa-meal has to be imported into Florida while the celery leaves are an abundant waste product there. Similarly, in Pennsylvania it has been found that the outer leaves, tops, and vines of broccoli and other vegetables contain more and better protein, riboflavin, and carotene than parts of the plant normally eaten. When dehydrated and milled, these discards make highly nutritious meals that can be used to feed poultry, animals, and human beings. Even the grass growing on well-fertilized golf courses has been found to contain a high percentage of protein."

I was particularly interested in the reference to the grass on golf courses—isn't it always well fertilized? It should be, judging from some of the stories that I have heard on golf courses.—E.J.R.

The Dental Focus of Infection

LEON LAKNER, M.D., Dr. Dent., Edinburgh, Scotland

Systemic Influence

MUCH RECENT medical and dental literature seems to corroborate the view that more attention should be paid to the teeth and the oral cavity as etiologic factors in systemic diseases. The following conditions have been observed to be caused directly or indirectly by focal infection from the teeth and oral cavity:

Alimentary System—1. Dyspepsia, flatulence, and anorexia may often be attributed to the swallowing of pus from pyorrhea alveolaris.

2. Duodenal or gastric ulcers may be experimentally produced by injecting, intravenously, virulent bacteria obtained from a dental focus.

3. Chronic ulcerative colitis might, in some cases, originate in focal infection. It was proved in a series of experiments that colitis can be caused by nonhemolytic streptococcus of the same type found in dental foci. After dental foci had been eradicated and the patient injected with a proper amount of autogenous vaccine, colitis would promptly subside.

4. Appendicitis and cholecystitis may be directly due to metastases from a dental focus of infection such cases, however, being very rare.

5. Hepatitis was in one case traced to alveolar pyorrhea.

6. Formation of cancers in the alimentary canal has been suggested as being due in part to dental foci of infection, particularly alveolar pyorrhea. One investigator reported that a large percentage of people suffering from pyorrhea are cancerous because continual swallowing of septic masses causes gastritis. In many cases this may precede the actual development of cancer.

Kidneys — 1. Glomerulonephritis often has its origin in oral infection. The acute glomerulonephritis following scarlet fever is a typical example where the primary focus is in the tonsils.

2. Possibly dental foci may be re-

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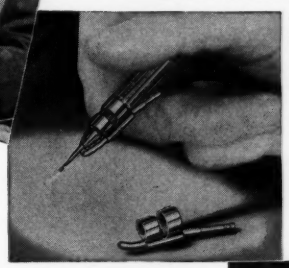

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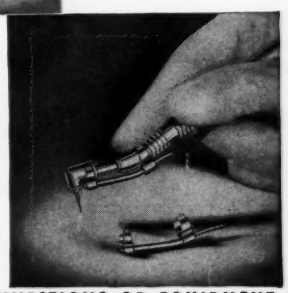

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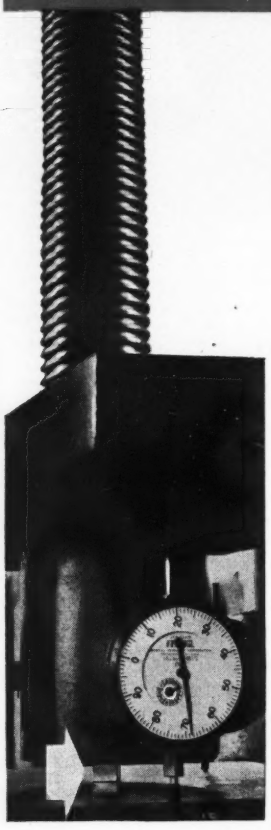

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sponsible to some extent for nephrosis and chronic diffuse nephritis.

3. Pyelitis and pyelonephritis are often caused by streptococcal or staphylococcal infection and not so much by Bacillus coli as was formerly thought.

Anemia — Secondary anemia is often the chief finding in oral infection. Thrombocytopenic purpura may be similarly caused.

Heart and Blood Vessels—1. Bacterial endocarditis is always associated with some distant primary foci. In young people the foci are usually situated either in the tonsils or in adenoids; in adults dental infection is usually responsible. The condition progresses rapidly and usually is fatal.

2. Myocarditis may sometimes develop simultaneously with rheumatoid arthritis. This complaint will follow a long period of absorption of toxins from chronic dental foci.

3. Divergent views are held as to whether hypertension is occasionally caused by dental infection.

Arthritis—Joint affections of all types except acute rheumatic fever may have some connection with dental foci of infection.

Effect on Nervous System and Mental Health

Polyneuritis and neuralgia of the trigeminal and sciatic nerve have been known to develop from oral infection. Symptoms of neurasthenia may develop due to the slow absorption of toxins from infective foci. Good results in mental patients have been observed after the extraction of diseased teeth.

Eyes—It is well-known that many eye diseases have their origin in focal infection. The routes by which infection reaches the eye from the teeth are described as follows:

1. After the destruction of the bone surrounding a tooth, infection reaches the eye directly.
2. Through or beneath periosteum.
3. By blood vessels.
4. By the lymphatics.

Sepsis—Lassitude and occasional rises of temperature in otherwise healthy individuals may often be due to the slow but continuous penetration of bacteria from dental foci of

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infection into the general circulation. The symptoms increase as larger masses of bacteria succeed in reaching the bloodstream, a state known as bacteremia.

The natural body defences represented by the blood, bone marrow, liver, and spleen usually succeed in destroying the bacteria. If, however, bacteremia tends to occur repeatedly, or if the general body resistance is lowered by other causes, the defences are easily overcome and general infection of the organism results. In such cases a blood culture is usually positive; the prognosis is very unfavorable if Streptococcus viridans is found.

—From *The Medical and Dental Bulletin* 19:62-65 (July) 1947.

Topical Application of Fluoride to Reduce Caries

LOUIS I. GROSSMAN, D.D.S.
Dr. med. dent., Philadelphia

Technique

Scaling and Polishing—Scale the teeth. Polish thoroughly with pumice paste, prepared by adding pumice (or silex) to equal parts of 4 per cent sodium fluoride and hydrogen peroxide. Caution the patient against swallowing any of the paste and have him rinse thoroughly from time to time.

Upper Teeth—Place 2 dropperfuls of 4 per cent sodium fluoride solution in a dappen dish and add 2 dropperfuls of hydrogen peroxide to make an acidified 2 per cent sodium fluoride solution.

Apply cotton rolls to wall off teeth in the upper jaw. Dry the teeth with a cotton roll applicator and compressed air. With another cotton roll applicator, apply the 2 per cent sodium fluoride-hydrogen peroxide solution. Let remain on the teeth for four minutes, timing with an interval timer or clock. Remove any excess solution left on the teeth with a cotton roll applicator and apply a suspension of calcium sulfate by means of another cotton roll applicator. Time for one minute. Remove cotton rolls and let patient rinse mouth thoroughly.

Lower Teeth—Repeat this application on the lower teeth. (It is preferable to treat only one-half of the lower jaw at one time because of the rapid accumulation of saliva.) Change cotton rolls as often as is necessary to prevent saliva from coming into contact with the teeth during treatment.

The entire procedure of applying the sodium fluoride solution and calcium sulfate suspension should be repeated every three months in order to obtain as near an optimum effect as possible. It is best to schedule such applications in advance so as to ensure adequate treatment.

Results

Topical application of sodium fluoride solution to the teeth, in the manner indicated, should reduce dental caries in young teeth approximately 40 per cent if the treatment is properly and regularly carried out.

—From *The New York State Dental Journal* 13:512 (November) 1947.

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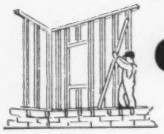

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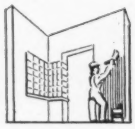

Are you paying to keep the dirt *on* your walls? . . . Are you *buying* that hole in the linoleum? . . . Are you *spending good money* for the privilege of using *old* equipment rather than new? . . . Could be. Read Harold J. Ashe's article, "Office Modernization and Income Taxes," and then get out your pencil and paper . . . Maybe you can actually *save* money by giving your office that "new look."

★ ★ ★

Disgusted with the V. A.? . . . Ready to cross veterans' cases off your list? Before you do, read "The V. A. —Review and Preview" by John S. Voyles, D.D.S. You may change your mind.

★ ★ ★

Discouraging note: "Were you to limit your practice to normal persons only, you might as well close your office," says Joseph Murray, D.D.S., as he explains how to recognize certain types of neuroses, and warns the dentist to avoid patients who exhibit certain marked symptoms.

★ ★ ★

"A Patient Considers the Value of the Dental Hospital" . . . Patient and dentist may both profit through the establishment of dental hospitals, explains Evelynne Siebert in an article which should be given serious attention by the dental profession.

"The Case of the Crying Child" . . . is not a mystery story, although Doctor Harry C. Peake intimates that how some parents allow their children to become "howling brats" is pretty much of a mystery to all dentists. Doctor Peake has a solution—one that works if the child is crying from fright. Nothing works if the child is a "howling brat."

★ ★ ★

One man's poison may be another man's "meat." Snake venom (complex animal proteins) are being used successfully in the treatment of epilepsy, in controlling hemorrhage, and in producing long-lasting analgesia. Claude W. Clifford, D.M.D., writes an extremely interesting article which should prove useful to many dentists.

★ ★ ★

"What Price Dental Deans?"—John W. Cooke, D.M.D., draws contrasting pictures of the deans of twenty years ago and of today—and suggests that "Dentistry will get and keep good deans and teachers when they are paid adequately—and when the positions offer more than a semblance of protection and security."

★ ★ ★

Besides the articles high-lighted here, there are pictures, features, announcements, and all of the regular monthly departments to start the new year off happily, we hope, for every dentist reader.

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